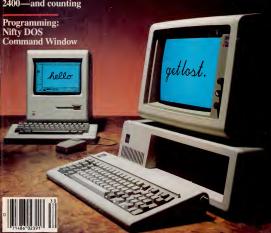


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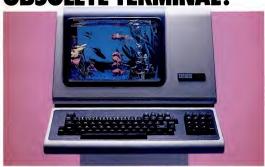
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What's Inside

Amid canceled vacations and cross-country traveling that would make Jack Kerouac jealous, PC Magazine rips off the kid gloves to compare the Mac and the PC head to head.

he was just trying to squeeze in a little vacation. But PC Magazine's cleentless editors tracked down Diane Burns in Florida, thousands of miles from her San Francisco base of operations. Burns and her partner Shary Venit, are two of PC Magazine's most interpid and far-ranging contributors. They've written about graphics, word processing, spreadsheets, daabasee, and as lew of other computer-related topics.

When Burns finally came up from the beach, she called editor Bill Machrone from a pay phone. The din of traffic all but drowned out their conversation. "Hi. Bill. Heard you had an assign-

ment for us."
"That's right, and it's a lulu. You and

Sharyn speak Macintosh, don't you?"
"Yes, we have a 128K Mac and a
Macintosh XL in the office."

"My sympathies. Listen, we've got a tight deadline: 3 weeks from today —4 if you write the story on the Apple."
"Okay wise guy Faqueh of the

"Okay, wise guy. Enough of the slow-Mac jokes. What's the assignment?"

Machrone explained that he was becoming more and more irritated with Apple's claims that the Macintosh was ready to take on IBM in the office. He admitted that he was willing to overlook the more outlandish claims when there was no software available, but now that people were beginning to take Apple seriously, it was time to respond.

"They're actually buying Macs to do spreadsheet and database applications," complained Machrone. "That's PC



"Bill, I don't think I've ever heard a bigger PC chauvinist than you," said Burns.

"You ought to talk to Somerson. He wears blue-colored glasses."

Executive editor Paul Somerson is famous for his anti-Mac bias. Every time he says anything derogatory about the Apple machine, he gets a ton of hate mail and prompts a few canceled subscriptions.

"The best cut was when he referred to the Mac's 'learning-disability icons' in a recent issue," Machrone continued. "He's now on three or four death lists." "There are strong advocates on both

sides," said Burns diplomatically.
"What are you going to do about it?"
Machrone chortled. "What PC Magazine does best—a comparison test."

Burns was aghast. "PC Magazine is

going to do more than just barely acknowledge the existence of the Macintosh?" She agreed, however, that it was stime somebody took a good, hard look at the pros and cons of each machine.

Machrone's next remark clinched the deal. "Besides, who else has the guts or the talented writers to do a review like this?"

The Showdown

Over the next several days, Burns and Machrone did their best to wipe out MCI Mail's operating deficit as they exchanged ideas coast to coast.

Associate editor Jennifer de Jong made the superme sacrifice of Hying to San Francisco for a dimense meeting with Burns and Venti. Maggie Canon, the editor of PC's Apple-oriented sister publication, A+, joined them. Canon had agreed to review the proposed tests to make sure PC didn't sandbag the Mac, intentionally or otherwise. Everyone had a frie evening our, reached an accord on the tests, and Machrone only blanched A month later. Burns and Venit

emerged from the lab with some surprising results. In the final days of testing, de long was keeping West Coast hours, while Burns and Venit were keeping bours that only one of Salvador Dali's clocks could track. The final report came across the wires at 1 a.m., San Francisco time.

The fact that they wrote the report on a PC and created the graphs on the Mac only begins to hint at their findings. Burns sums it up:

"Basically, we found the Mac to be a communication machine, while the PC is an information machine. However, the line between the two can be extremely subtle."

And That's Not All

There's the usual complement of hardware reviews in this issue as well. M. David Stone and Al Glossbrenner test the latest 2400-haud modems. Both Stone and Glossbrenner have published successful books on telecommunications and have great expectations for higher modem speeds. The question is, do these new products measure up?

PC also looks at Canon's PC-compatible machine. Canon introduced the machine as Athena, a name that connotes strength, wisdom, and full adulthood at birth. Athena sports excellent color

Basically, we found the Mac to be a communication machine, while the PC is an information machine. The line between the two

however, can be subtle. graphics end nestles, somewhere be-

tween the PC and the AT in performance. For reasons unknown, though, Canon has renamed the machine the A-200. which connotes nothing. Too bad. There's probably a garden tractor or something that got first crack at the Athe-

Affected Addiction

It's no secret that Machrone is a Radio Shack Model 100 addict. He carries his everywhere, mainly because he is a commuter and uses it for MCI Mail on his travels. It extends his workday, he says, Workaholic, say the rest of us.

In this issue, Machrone shows how vou can make vour Model 100 a better PC accessory with some judiciously selected products from the aftermarket. Just the other day, he extended the range of his own machine using little more than imagination spiced with audacity and showed us how truly obnoxious a portable computer (and its owner) can be. While addressing the assembled editorial and art staffs for some announcements. he momentarily lost his train of thought. then self-consciously picked up his Model 100 and began to scroll through a file in search of the meeting's agenda.

"I hope you won't consider this too affected," he said, "but I didn't have time to print out my notes beforehand." No Machrone, not too affected.



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tight code

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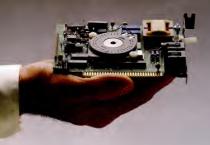
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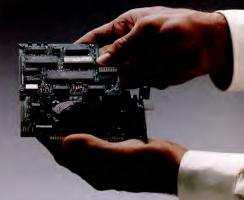
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ProKey 4.0 keyword macros unsnarl PC use.

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Behind the scenes, ProKey 4.0 checks its memory for the string of commands required to carry out the task and executes them automatically. Forgotten what functions you have available? Just call up the built-in menu that describes them in plain English.

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PC Data Is Vulnerable To Attack

Experts warn that PCs lack adequate security.

BY WINN L. ROSCH

NEW YORK-When a squad of espionage agents stationed itself near the Denver plant of a major defense contractor, no one paid any attention. In fact, no one noticed them until the team of crack surveillance experts marched into the plant and reported, "Gentlemen, we have a security problem."

Startled executives in the plant gasped when they saw exact transcripts of their every personal computer keystroke and word-by-word replays of their most confidential telecommunications laid before them. Nearly every electronic activity in the plant had been duly recorded, in many cases by merely tuning sensitive radio receivers into the emissions generated by the plant's computer gear.

"They came in and just destroyed us," one executive told a security consultant. (For obvious reasons the consultant preferred that his name and that of his client not appear in print.)

On Our Side

Fortunately, the agents were on our side. The National Security Agency's goal in the experiment was to determine the state of electronic security in the defense industry, and, according to the computer security consultant hired to help straighten things out in the aftermath, it was in a sorry state, indeed. The darkest side of the story

was not simply the loss of important strategic information but that no one at the targeted plant had been aware that its security had been breached. No one realized how vulnerable to eavesdropping the electronic equipment in the plant was, especially personal computers, and that confidential computer data could be compromised merely by running it through a



PC. Numerous new products promise some relief (See

'Some PC Lines of Defense''). Since then, new security measures taken at the plant have become an example that the rest

of the defense industry is following. But even as the shock waves from Uncle Sam's little visit rocked the defense industry, private PC users continue in (continued on next page)

WARNING!

destroy your data. Beware the sudden upsurge in "Trojan horse" programs on bulletin boards and in the public domain. These programs purport to be useful utilities, but, in reality, they are designed to sack

vour system. One has shown up as EGABTR, a program that claims to show you how to maximize the features of IBM's Enhanced Graphics Adapter, and has also been spotted as a new strings and data. If there is any-

tually erases the file allocation about it, do a cursory disassemtables on your hard disk. For good measure, it asks you to put rupt 13H), especially if the proa disk in drive A: then another in drive B:. After it has crased those FATs too, it displays, "Got you! Arf! Arf!

Don't run any public-domain program that is not a known quantity. Have someone you know and trust vouch for it. Always examine it first with DE-

Warning: Someone is trying to | super-directory program. It ac-| thing even slightly suspicious bly. Be wary of disk calls (intergram has no business writing to the disk. Run your system in floppy-only mode with writeprotect tabs on the disks or junk

disks in the drives. Speaking of Greeks bearing gifts. Aristotle said that the unexamined life is not worth live

ing. The unexamined program BUG, looking at all the ASCII is not worth running.

—The Editors of PC

PC Data (continued from page 33)

their complacency, unaware that virtually anyone could be listening in.

PC Security Scandal

In nondefense industries, not required by the government to take strict security measures. computer security is lax. Few PC users give security a second thought, perhaps thinking that spy stories are mere products of naranoia, an overactive imagination, or an overdose of James Bond. But the consultant working with the Denver plant believes the evidence is otherwise.

"Why do some companies lose bids to competitors who undercut them only by a dollar or two?" he asks. "Such very narrow margins probably illustrate intelligence gathering on the competitor's part.

A growing number of experts believe that security is the biggest scandal in the personal computer industry. Some go so far as to rate it as an impending disaster.

According to a survey conducted by the American Bar Association, computer security

problems are already immense. About 40 percent of the organizations responding to the ABA questionnaire indicated that they had detected and verified the occurrence of "incidents of computer crime" within the year immediately before the survey. The survey pegged those single-year losses between \$145 million and \$730

Even the ABA's multimillion-dollar figures hardly hint at the true cost of losses attributable to computer security failures because most victims never even know a crime has taken place.

million.

According to Robert Wise. corporate communications manager of Sentry Software. "Between 90 and 95 percent of all computer security breaches go undetected." Potentially. then, the cost of inadequate computer security may be over

\$15 billion. Growing Problems

Experts agree that the fastestgrowing problem area in computer security is now the personal computer. Although elaborate security measures are routinely employed on mainframe computers, PCs afford almost unlimited opportunity for intrusion. The current trend to integrating PCs into networks and mainframe systems now makes once secure data more vulnerable

According to the American Bar Association, security

problems are immense "The problem is that corpo-

rations are now linking PCs into a secure mainframe and downloading confidential information into the relatively insecure micro," notes Paul R. Broholm, vice president of MCTel, Inc.

In the last few years large corporations have recognized the problem. "Today I can call up most major corporations and ask for the systems security manager," reports Wise. "Five years ago that position didn't even exist.

ing the PCir out of the way so a

new machine can take its place?

Gibbs Moody, securities analyst

for the Gartner Group, doubts

that IBM would aim another ma-

chine at the home market, "Demand is very soft there," he says.

It would make sense, though, if

IBM came out with a quality low-

end product, "IBM intends to be

more of a presence in the educa-

tion market, and it really doesn't

have a machine that's viable for it

The Portable PC has been re-

duced from \$2,595 to \$1,950, a

drop of 25 percent, for a system

now," explains Moody.

A Lighter Portable

Other large corporations have gone so far as to adopt bruteforce preventive measures. For instance, one major oil company now forbids PC-to-PC communications entirely.

Even that seemingly extreme step does little to plug leaks. Entirely self-contained systems and single PCs are vulnerable to the efforts of elaborate electronic surveillance and the effects of simple carelessness alike.

Moreover, individual PC users and small comorations often fail to take even minimal security precautions. Like the Denver defense contractor, they haven't considered that anyone might be listening in.

Bailing out PC Leaks

In fact, when it comes to security, the PC is a box of woes that even Pandora wouldn't touch. Confidential information

can leak out in countless ways. With the exception of the few portable PCs that use bubble memory, all PCs rely on some form of magnetic medium for mass storage. All computer media share a few common characteristics that are a security

manager's nightmare. The information that magnetic media contains is readily copied. Personal computer media are readily transportable and therefore easy to conceal and steal. A whole hard disk of data can be loaded onto a tape cartridge that slides discreetly into

a jacket nocket

Moreover, the personal computer can change a minor annovance, theft of office equipment, into a major disaster when the equipment stolen is a computer containing all of a company's records.

Even crased media pose security problems. DOS's ERASE and DEL commands only render a file invisible, leaving its data intact on the disk and recoverable with a program like The Norton Utilities.

When a PC is connected to any kind of communications system-telephone line, network, or micro-to-mainframe line-security problems are bound to multiply.

Most PC networks provide only a limited amount of security and almost endless opportu-

Price Cuts for Portable, PCir \$725-a 27 percent drop from

\$2,595

BY JAMES LANGDELL BOCA RATON, Fla.--IBM has drastically cut prices for its PCir and Portable PC, marking down IBM Product Center tags on these disappointing performers by as much as 27 percent.

A PCir with 128K RAM and a 360K disk drive now costs

the \$999 list price. The price of a PCjr Color Display has been cut by 7 percent, \$429 to \$399. No software is bundled with this computer and IBM did not reduce prices on other PCjr peripherals.

IBM's list price for a complete PCir system is still higher than those of-

fered during last winter's special promotion. when some dealers sold pack-

ages that included IRM's color monitor and software for as little as \$795.

Is IBM clear-

with 256K RAM and one 360K disk drive. The price of a Portable PC with a second disk drive dropped 22 percent, from \$2,895 to \$2,250

"I'm surprised it's taken IBM this long to cut prices," says Moody, "because the machines have not been moving well through retail distribution channels.

\$1,950

Some PC Lines of Defense

Two years ago security schemes centered on the PC were virtually nonexistent, but today you have your choice of strategies, each designed around a particular PC security weakness.

One such strategy, based in access control systems, limits who can operate and access files on a PC either by requiring passwords or using physical locks and keys. Both hardware and software products are available

to control access.

Stoplock IIR from Quest IV
Industries in Lawrence, Kan, is
a hardware access control system built around a single ½length expansion board that
plugs into a PC expansion slot.
By requiring you to type a psiword before the PC boots up, it
effectively prevents office
prowlers from pouring though
your hard disk files.

your hard sids files.

Yeek. Inc. of Mountain
View, Calif. offers a very high
degree of security with a combination of hardware access control and physical keys in its PFX
identity authentication system.
To access the computer system,
each operator must use a "passport" key, an electronic device
that generates the required password based on constantly
changing information sent by

the system to be accessed.

Sentry Software in Los Gatos, Calif. offers an inexpensive
(\$49) system, Disksafe, aimed
particularly at office snoopers.
The Disksafe system requires a

nities for compromising it. Intruders can simply learn passwords by casually looking over shoulders, using software probes, or relying on elaborate hardware schemes that can monitor and record all traffic down the network or host-interconnect lines.

Unless data has been encrypted, it might as well be considered compromised as soon as it steps into the outside world. Telephone line tappers can listen with equipment no more sophisticated than a few feet of wire and a pair of alligator clips.

special "soft key" floppy disk that you insert in the A: drive to use hard disk files. Data encryption schemes translate files into a coded form

translate files into a coded form that allows you to transmit confidential data through unsecure communications channels with-

out worry.

One encryption system, Data Encryption Standard (or DES), has been certified as secure by the standard standard (or DES), has been certified as secure by dards, and it serves as the foundation of Phasor Code 1000.

Made by International Phasor Teleom Ltd. in Vancouver, British Columbia, PhasorCode 1000 encodes disk files in a few seconds, transforming text into an array of mostly unprinable and array of mostly unprinable on a property only by someone with the proper decryption (key).

The Public Key Encryption system from Datamorphies Ltd. of Sittsville, Ontario offers security beyond the DES standard, allowing keys of up to 600

digits long.

Achieving total security for critical applications requires special equipment. "Tempest"-class personal computers (manufactured by IBM and other companies) eliminate security leaks from radio frequency emissions. New COMSEC computers, the first now available from GRID Systems Corporation of Mountain View, Calif. add built-in communications see

curity systems.

Wireless caveadropping is not limited solely to intentional data transmissions. Specialized monitoring equipment can detect PC-generated radio interference. Such emissions probably were sufficient for the Nato to record each keystroke that came from the Denver defense plant's PCs.

-W.L.R.

"The biggest problem with computer security is that nobody wants to talk about it," said the security consultant. "It's like drugs and their kids. Everybody has got problems in his house, but nobody wants to say anything."

Controversy Continues Over Free XT Software

BY CHARLES BERMANT NEW YORK-In a letter to IBM implying the threat of legal action, William Sellers, Leading Edge's manager of sales and marketing, protested IBM's decision to promote sales of the PC-XT by giving away free software for a 90-day period Sellers wrote, "We at Leading Edge were among the many software vendors shocked by the recent announcement of IBM's decision to offer software free of charge to purchasers of IBM microcomputers. Adoption of this policy will likely be devastating to our business .

Sellers found sympathetic ears at the Association of Data Processing Service Organizations (ADAPSO), which also sent a letter of protest.

Oscar Schachter, president of Advanced Computer Systems in New York and chairman of the ADAPSO vendor relations committee, says he expects an answer to his organization's letter soon. He speculated that BM will maintain that the packaging action is no different than what other manufacturers

Schachter adds that at the standard PC price level, consumers are concerned more with how well software works than with whether it comes free. "It think people would rather have a reduced price on a PC and be able to choose their own soft-ware," he says.

90-Day Relief

IBM has insisted that the inmodel of the period of the period of the period of the period of the dealer. It claims that it does not intend to squeeze small software manufacturers out of the market, and at the end of 90 days, some time in early August, it will be business as usual.

"It's unfortunate that this has been interpreted as being anticompetitive," says one IBM software source. "There are promotional moves that you take for promotional reasons. It's not a long-term thing."

Other observers, however, have a more cynical view. Some sources have said that both the XT and DisplayWrite are doing poorly and that offering the two products together was a way to bail out both. Another source



Therese Myers, president, Quarterdeck said that IBM was mindful of

the headlines the action would generate and timed the promotion for maximum impact.

What, Me Worry?

While considerable negative reaction came from manufacturers of word processors, Quarterdeck Office Systems, the Santa Monica, Calif. manufacturer of a windowing environment that competes with TopView, does not share the prognostications

"We sell DESQ, our windowing system, to the existing user base," says Quarterdeck president Therese Myers. "This bundling is going after a new user. It will not affect us, because they're going after a new niche. It even has the potential of expanding our market: People may try TopView and, sering its limits, buy DESQ."

Myers says that MultiMate is IBM's prime competition in this area. Yet Wilton Jones, president of MultiMate International, has said that the promotion's impact on his sales would be negligible.

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any direction!
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Sculptor generates actual program source code

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(718) 458-3700. If we're shipping to a NYS address, please add 814% rules tax.

A KEY MATCHUP: ProKey vs. SuperKey

PRODUCT REVIEW

BY STEPHEN MANES
A championship bout is shaping
up in the keyboard enhancement
software market for 1985.
RoseSoft has released a new and
better version of its classic

the finer points of the programs.
Both ProKey and SuperKey
let you "leave room" in mercos
for fixed-length fields like ZIP
codes and variable-length fields
like filenames. ProKey shows
that you "re typing in such a field
by changing the cursor size, but
occasionally that doesn' work:

Yet only SuperKey macros can call SideKick or easily include some other useful features in a macro: variable tones, the current disk drive letter. For menus and such SuperKey permits display-only macros whose; keystrokes go to the screen but

signments of untitled macros; SuperKey displays such macros as blank entries.

Both programs include popup macro editors, but even though it includes extra functions, SuperKey's editor is a pain simply because its Backspace key doesn't crase. ProKey's editor may do funny things to a macro if you begin a variable or fixed field and forget to end it; SuperKey tends to cach such things, but, unlike ProKey, doesn't flag "endless loop" macros before playback. Both programs allow "one-



Borland International's SuperKey 1.0

The partners are for Probe A at James S and A probe S and A problem S and A probe S and A probe S and A probe S and A probe S an

RoseSoft's ProKey 4.0

ProKey at the same time upstart Borland International began shipping its much-ballyhooed challenger, SuperKey

challenger, SuperKey.

For nearly three years

ProKey has been hailed as the
industry standard in keyboard
enhancement: software that lets
users assign special keystroke
sequences (macros) to individual keys or key combinations.
The new version, ProKey 4.0,
is easier to use and offers new
features.

features.

Borland's SuperKey is a worthy challenger. No mere knockoff, it incorporates virtually all of ProKry's features and a lot more, including file encryption, a DOS command editor, and a knockout user interface. It's unquestionably the best new program'l ve seen since Borland's Sidekick, a best-seller whose success Borland hopes to match with bits entry.

Although the accompanying table (see Key Matchup on page 38) tells the "tale of the tape," here's a ringside rundown on ProKey 4.0 RoseSoft 4710 University Way, N.E., Suite 601 Seattle, WA 98105

Seattle, WA 98105 (206) 524-2350 List Price: \$130.00 Requires: 96K RAM, one disk drive.

sometimes the cursor can even disappear, SuperVey is less elegant. For variable fields it bleats electronically at each character you type; for fixed fields it slaps a a special window up on the screen. Super-Key also lest you force alphabetic; uppercase, lowercuse, or numeric entry in fields and formats them in various ways. Unfortunately, its use of the period character for formatting causes incompatibility with ProKey flight.

Another incompatibility is in delays: ProKey allows much longer ones in macros and expresses them differently. If you need to call an on-line service while you sleep, SuperKey probably isn't for you.

SuperKey 1.0
Borland International
4585 Scotts Valley Drive
Scotts Valley, CA 95066
(800) 255-8008, in

California (800) 742-1133 List Price: \$69.95 Requires: 128K RAM, DOS 2.x, one disk drive.

not to the current application. It can even clear the screen and lock up the keyboard to keep busybodies from fooling around, without your secret

Unique to ProKey are macros of up to eight characters. You hit Alt-comma, type in the word, hit Enter, and the macro plays back. Also new are "guarded" macros, which you can't over-write accidentally.

Different Strokes

Both programs let you assign a title to each macro and display it alongside each currently assigned key. ProKey kindly shows the actual keystroke asfinger" mode, in which, say, pressing Ctrl followed by A gets you the same results as hitting Ctrl-A simultaneously. Both can reconfigure the entire keyboard and save the new setup in a file. Both enlarge the keyboard buffer to eliminate annoying chirps when you execute a series of commands.

Little Extras

SuperKey can steal data from the screen and assign it to a key for playback—great for data transfer between programs. And spreadsheet users may love SuperKey's user-defined set of extra arrow keys; you can turn them on or off in a flash.

SuperKey's unique 'com-

mand stack" remembers the last 256 characters you've typed at the DOS command level. At the touch of the Alt-Backslash (1) key combination, you can see, edit, and execute all your recent DOS commands. Once you try this feature, it becomes indispensable; it would be even bet-

Key Matchup	ProKey 4.0	SuperKey 1.4
GENERAL INFORMATION:		
Copy protection	No	No
On-line help	Little	Extensive
User can customize		
Colors and highlighting	No, no color	Yes
Position of help line	Anywhere	Top or bottom
Default memory used (in bytes)	41,072	56,080
	(Add about 1K with	(Add about 3K with
	keyboard layout	DES encryption
	option) 4K	option) 8K
Default memory for macros	30K	8K 64K
Maximum memory for macros	None	
Disk space needed for help files	None	37,632 bytes
MACRO CREATION AND PLAYBACK:		
Creates macros		
By "recording" keystrokes	Yes	Yes
With built-in mscro editor	Yes	Yes
With most text editors	Yes	Yes
Reads and writes macro files	Yes No	Yes
Default paths for macro files Fixed- and variable-	Yes	Yes
ingth fields	100	100
Formatting options	No	Yes
Data entry masks	No	Yes
Separate macros for	Yes -	Yes .
Shift-keypad and top-row numbers		E4
Separate macros for Ctrl	Yes	No
equivalents of backspace,		
tab, and enter keys		
Macros keyed by mnemonic	Yes	No No
words	- July 1	70 300
Guarded macros	Yes	No
Display-only macros	No	Yes
EXTRA FUNCTIONS IN MACROS:		
Variable tone	No	Yes
Current system date	No	Yes
and/or time		
Lock keyboard	No	Yes
Clear screen w/o DOS assist	No	Yes
Current DOS drive and path	No	Yes
"Skip macro" key	Yes	Yes
	I sec. to 256 hour	
Can call SideKick in macro	No	Yes
Macro directory Displays assigned titles	Yes	Yes
Displays assigned titles Displays actual macros	Yes	Yes No
Sample macro files included	Yes 8	20
		20
SPECIAL FEATURES: Redefine program command	Startup only	Anytime
keys		
Switchable extra arrow key set	No	Yes
Variable typing speeds	Yes	Yes
Redefinable keyboard layouts	From DOS if	From DOS anytin
	invoked at startup	
Alternate layout files supplied	9	1
Compatible with ProKey	Yes	No No
layout files	Cher.	
Optional electronic key click	No	Yes
Cut screen data, assign to key	No Yes	Yes Yes
Automatic screen blanking Selectable delay	Yes No	Yes
Can be switched on or off		Anytime
Can be switched on or off Type-ahead buffer (in bytes)	Startup only 0 to 250	Anytime 128
DOS command editor	No.	Yes
File encryption	None	Yes

(continued from page 37) ter if its window scrolled automatically.

SuperKey has an electronic key-click option that you can arm on and off, except in those noisy variable fields. Both ProKey and SuperKey can protect your sereen by blanking it out when nothing's happening.

Tales from the Crypt

Finally, only SuperKey offers an encryption facility, or, nore precisely, two. Its proprietary algorithm is super fast, employing the filename and a user-chosen keyword; with a hard disk, it can encrypt or decrypt a 7,300byte file in 2 seconds. The government-standard DES mode is also available but takes longer. 15 seconds for the same file

Both modes are supposed to directly overwrite the old file for data security. When I tried the DES mode, however, it added to be the DES mode, however, it added to be the to the control to the to the to the control to the to the correct length when decrypted. Nonetheless all files I encrypted and then decrypted were absolutely identical to the originals.

Either mode can encrypt files into pure ASCII text for use with telecommunications systems that don't recognize highbit characters; the encrypted file that results is roughly double the size of the original.

The best thing about SuperKey's encryption system is that it awaits you at a key-stroke. Since it accepts wild card characters and a default path, you can encrypt whole subdirectories effortlessly. Than's also the worst thing. One wrong move, and you can wipe out a whole lot of data forever.

Gorgeous Screens

Like SideKick, SuperKey offers ruly geogeous displays that you can customize almost completely. When you thi Alt-slash (7), a mean line usurps the top three lines of the screen. Options displayed in a less prominant color or shade are usurealable. You select a legitimate one with its initial or arrow keys. When a Macintosh-like subneme drops down, the same letter-or-custor mode prevails.

F1 gets you help at any time from the best context-sensitive screens I've ever seen, provided the 38K help file is on a disk in

your machine.
The ProKey menu that you call with Alt-Slash gives you a bunch of single-letter options. It looks inclegant, but it generally gets you what you want in fewer keystrokes. It doesn't come in color at all, though, there's no on-line help, either.

But SuperKey's elegance can get you into trouble fast if you don't know what you're doing. The one-key commands execute instantly, and because of conflicts (4 of the 5 choices on the Commands menu begin with the letter S), many don't use the initial of the relevant word. The usable letters are capitalized,

but it's easy to miss them.

I unintentionally reassigned the down arrow to macro creation and then accidentally gave the End key a huge macro that did all sorts of terrible things. Changing such major defaults cought to require confirmation. ProKey lets you do it only at startup; though annoying, that does protect you from your own stundity.

Some Problems

Neither manual is more than adequate. SuperKey's is highly detailed on the actual operation of the program, but it's riddled with typesetting errors and short on examples. The exceptionally clear question-and-answer format README disk file covers the manual's most flagrant omissions.

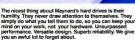
ProKey's manual comes with

a long errata sheet, a poorly organized 12-page, on-disk READ.ME file, and multiple appendixes, making it perticularly fustrainig to use. But it offers many specific tips, including troubleshooting for potential software and hardware problems that SuperKey's manual utterly ignores.

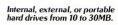
Ultimately, this matchup represens capitalism working as should. Competition gives the market better product at lower prices, and the customers come cout winners. ProKey is better than ever, SuperKey is about to take its place in my AUTOEXEC BAT file.













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m a single; portaine, device: Mozable Drive, Removable Media As the OneReel Tape plugs directly into external floppy controller connectors, a single drive makes the rounds of all the PCs, in the office and at home.

reinvented the wheel

Its random access ability permits reading and updating of individual files directly from the tage. Proprietary software allows true working duplicates to be made with the partial ability of the partial abil

Precision is Everything
The integral microcomputer
is the key to continuous, precise
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system never touches the
sensitive data surface.
The result; the ultimate

The result: the ultimate in data integrity and in media interchangeabilty.

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If you, too, refuse to accept the limitations of today's personal computers, call Sigma Designs. For the Sigma Designs source nearest you, call us at (408)943-9480. And reinvent your own computing procedures.

DESIGN

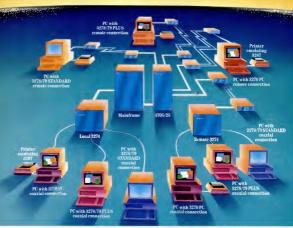
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CA 94303 TELEX 821945. We don't have all the answers, just more of them.

NEWS IN BRIEF BY JANE MINTZER

Faster than a Speeding XT . . . ITT Information Systems has announced an IBM PC-XT-compatible computer that uses the Intel 80286 processor, which, the company says, gives the machine a processing speed 3.5 times faster than the XT's. The ITT XTRA XP is well suited for programs that use a lot of graphics and communications capabilities.

The ITT XTRA XP has 512K RAM (expandable to 640K on the



megabyte of main memory available on a proprietary expansion board. one disk drive. and one 20megabyte hard disk, all for \$4,595 (the lower-level model comes with one disk drive and a 10-megabyte

By using the

ITT speed switch, accessed

by a keyboard command sequence, users can slow the system down to the processing speed of the Intel 8088 (4.77 MHz).

The XP supports both color and monochrome monitors; it comes with a parallel printer port, an RS-232C serial port, a socket for an 80287 math coprocessor, and five expansion slots

For more information on the entire line of ITT hardware and software, contact ITT Information Systems at 2350 Oume Dr., San Jose, CA 95131, (408) 942-4000.

BASEd in Japan . . . Mix Ashton-Tate, maker of dBASE 11, with a subsidiary of Japan Systems Engineering Corp., and you end up with Nippon Ashton-Tate, a new Japanese company created to

market Ashton-Tate products in Ronald S. Posner, executive



translate Framework for Asian marketing.

Rosald S Pormer

"Our goal is to produce and market software that combines the best of both worlds-our dBASE technology and worldwide marketing expertise with Japanese know-how." As a result of the venture between the two companies, Amer-

now appear in a Japanese version, and Posner says Ashton-Tate is working on an arrangement with IBM to have dBASE II slated into the Chinese language as well.

According to Posner, the company does not plan at this time to Eduing Towards a Low Price . . . Although many companies are now developing AT compatible computers, Leading Edge Hardware Products, Inc. has just announced a low priced United Kinedom.

4.77 MHz 8088-based PC clone with a footprint that is 28 percent smaller than the IBM PC

For \$1,495, the Model D PC comes with two floppy diskette drives, Hercules-compatible mono and RGB color output, serial and parallel ports, plus a green or amber monochrome monitor (\$1,949 with a color RGB monitor). The Model D PC version with one floppy drive, a 10-megabyte hard disk, and monochrome monitor costs \$2,395 (\$2,695 with color monitor).

We got an early look at both models. The Model D has one of the best keyboards of any compatible; some reviewers preferred it to IBM's. The keyboard comes with a 6-foot long cord that is frontmounted, as is the power switch and a very safe reset button. The Model DPC comes with 256K of memory and is expandable to 640K

Leading Edge, which has had substantial difficulty recently se curing sufficient Mitsubishi-built Model M machines, has teamed up with the giant Korean conglomerate Daewoo to produce the Model D. Additional information can be obtained from Leading Edge Products Inc., located at 225 Turnpike St., Canton, MA 02021, (617) 828-8150, or (800) 343-6833.

Chean Driving . . . Two new low-priced Winchester disk drives are available from Tandon Corporation. The Model TM362 is a compact, 31/2-inch drive with a 20-megabyte capacity suitable for use

in portable and small desktop computers. The 51/Linch

half-height form factor drive. Model TM262, can also be used with portables and desk micros.

Both drives feature a pseudoclosed-loop head positioning system that embeds data in the microscopic

wedge located on each data track. With this positioner the read/write heads can be adjusted during operation. Both drives cost less than \$300 if purchased in large OEM quantities. For more information, contact Tandon Corp., 20320 Prairie St., Chatsworth, CA 91311, (818) 993-6644.



Long Distance Calling . . . Overseas expansion is a bot item these days, and it didn't take IBM's new baby long to catch travel fever

ROLM Corporation, which recently became a subsidiary of IBM, is in the process of setting up a manufacturing and development facility in Wiltshire, England, located 80 miles outside of

The new European plant will develop telecommunications products to meet European specifications. Other European companies will supply many of the parts and subassemblies, but the final assembly and testing will be done in England.

Frank Onians will be president and managing director of ROLM Europe Limited. Before joining ROLM, Onians was managing director of TMC, a subsidiary of Philips Electrical Industries in the

COMMUNIQUES EDITED BY JAMES LANGDELL

The Devil Made Me Copy It

And you thought MicroPro was being tough when it sued Americ Brands, accusing them of making illegal copies of WordStar! Consider these conditions spelled out in the final paragraph of the license agreement for a keyboard enhancement program called MJ from Mother Jones's Son's Software Corporation. It reads:

Now for the, ah, fungs . . . Thirty days after you violate this agreement, ownership of your eternal soul automatically passes to us, and we have the right to negotiate the sale of said soul to the first smoking, blood-drenched apparition with fangs (SBDAWF) that meets our price.

Anyone desiring information about either the software or the availability of repossessed souls can contact the company at 6310 Cabellaro Blvd. Buena Park. CA 90602, (714) 522-7762, MJ costs. \$30, or \$70 if you want the full assembler source code. You're welcomed to copy another user's MJ disk, but Mother Jones's Son's Software insists that you then send \$20 to become a registered user. We strongly suggest you do just that, "Half of our husiness," says



Mother Jones's president Rick Bennett "has come from people who copied the software and felt compelled to comply with the agreement by sending us money."

Okay, all you Johnny-comelately bulls and bears. C.D. Anderson has a challenge for you, and he's willing to put up 25 big ones that say he's right.

Anderson, president of San Francisco's DeskTop Broker, Inc. says Trade*Master stocktrading software, developed by Trade*Plus, Inc. of Palo Alto, Calif.. was the first to actually be used by a customer to buy and sell stocks using a personal

computer. To say the least. Anderson is not happy when newcomers to field are heralded as pio-

A \$25,000 Bet: Who's the First PC Stockbroker?

neers or touted as the first company on the (trading) block. since it was a customer of his brokerage firm, C.D. Anderson & Co., Inc., who made the historic stock purchase in 1983. So he's nut up \$25,000 and issued the following challenge to all comers

His company offers the money to any brokerage company that can prove that it met the fol-

lowing conditions prior to June 14, 1983: "1) Effected a valid trade of listed shares via a personal computer on a real-time, interactive basis; 2) offered that capability on a continuing basis to its customers; and 3) provided necessary administrative

support for those trades. We're not exactly sure why it's so important to be first, but we think it is refreshing at long last to hear about a company that claims, "We're number 1," and is more than willing to put its money where its mouth

It's Good to The Last DOS

Microrim, creator of the R-Base database software, wages its war against dBASE's Ashton-Tate even on the home front of its Bellevue, Wash. headquarters. In the past year, Microrim has fired off a series of two-part ads, which urge readers to compare dWAY of using dBASE software with R-Way of using R.Rose

The spirit of this side-by-side chatlenge is echoed in Microrim's employee lunchroom. When the company's workers take a break from their labors to seek an invigorating cup, they now find two signs posted above a pair of coffee machines. The decaffeinated spigot is labeled "D-Caf." while "R-Caf" identifies the more-potent brew on the left.

Microrim's programmers, like most of their wired-up peers, are probably cup-carrying members of the Coffee Achievers.



If you single-handedly keep your neighborhood recycling project alive, have we got a product for you.

Computer Friends makes the Mac Inker, a device that will reink the ribbon cartridges used on over 600 different printers. We tried one re-inker designed for the Texas Instruments 855 and Epson MX-80 and MX-100

The Mac Inker contains a small motor that pulls the ribbon across an ink-moistened pad. refreshing the entire length of the ribbon loop. On our first try. we grossly overinked the ribbon, not quite believing the Mac

Inker instructions, which stressed that "IT IS NOT NEC-ESSARY FOR THE RIBBON TO BE TOTALLY WET WITH INK DURING RE-INKING." But even this saturated ribbon recovered quickly. After it printed about 20 smeary pages, the subsequent print quality was dark and even-good as with a new ribbon. Once we were convinced to use a gentler hand on

were fine from the start. Inkine each ribbon took about 25 minutes. The main physical drawback to using the Mac Inker was the mess. The few times we came in contact with the ribbon and the ink bottle were enough to blacken our hands with ink that

the ink bottle, other ribbons

didn't all wash off until the next day. For Mac Inkerus, and ers, plastic gloves are handy For most of us, though, newer ribbons are an easier investment. After all, the Mac Inker itself costs between \$59.95 and \$89.95. Computer Friends is located at 415 SW Canyon Court #10, Portland, OR 97225,(503) 297-2321. ■

Have computers surprised you lately? If you've discovered something unusually useful or simply unusual, we'd like to hear ahout it. Should we use your news in the Communiques. pages, we'll pay you \$50. Please write to Communiqués. PC Magazine. One Park Avenue. New York, NY 10016; MCI Mail 157-9301, or phone James Lanedell at (212) 503-5264



C'est vrai! Everything's more stylish in France-even IBM. To promote the IBM PC, the French branch of Big Blue whipped up a flashy four-page ad in an April issue of the newsweekly Le Paint that was a

san et lumière extravaganza. "Open your eyes wide, because you won't believe your warns the Little Tramp. It actually was a shock when we turned the page and heard the magazine play electronic Christmas songs. Then we noticed that a photo of an IBM PC had several LEDs wired in so the disk drive's red lights blink, the monitor's On light glows green, and a green cursor flashes above a graph on the screen. Quite a tour de force!

We doubt that IBM will copy its French fashion of advertising on this side of the Atlantic. According to Advertising Age's April 25, 1985 issue, it cost IBM \$2 apiece to put an electronic device in each of Le

Point's 325,000 copies. Two things puzzle us. Why is IBM playing Christmas songs while it's April in Paris? Or do continental listeners even recognize that "Rudolph the Red-Nosed Reindeer" and "Jingle Bells" are out of season?

Comic Release

In a world where Dom Deluise is hired to sell computers, it seemed inevitable that more of America's favorite comics would be enlisted to push micro products. And so it is, except that in this instance, comics is short for comic strips

Game manufacturer Sierra On-Line was one of the first software companies to license cartoon characters when it acquired the rights to put the casts of Johnny Hart's B.C. and The Wizard of Id into computer games such as Quest for Tires.

Another line of Sierra On-Line educational games, including Mickey's Space Adventure.



spotlights Mickey Mouse, Donald Duck, Winnie the Pooh, and other animated stars farmed out

by Disney. Sierra On-Line also has the right to turn the Family Circus panel cartoon into software, but plans for those programs are grounded for now.

Snoopy, Charlie Brown, and other Peanuts characters appear on screens of six Random House Software educational games for the PCjr. One of these, Snaapy's Skywriter Scrambler, gives practice at word recognition. There's no German lessons with the Red

Baron on disk, though Comic book superheroes are

fighting their way onto diskettes too. Superman and Wonder Woman, created by D.C. Comics, have teamed up with First Star Software and will appear in a line of "Super Powers" proerams this September. An earli-

an unusual source-Mad

Magazine's silently scheming

First Star Software of New

York City is an affiliate of

Warner Software, Inc. Both

Mad and D.C. Comics are parts

of the Warner's entertainment

"Spy vs. Spy."

empire as well.



Not a Bogev

Who ever would have imagined that Charlie Chaplin and Big Blue would putter around with greens? Yet this spring, IBM's print, radio, and television ads for its PC and XT featured the Little Tramp playing golf in the "IBM PC Classic.

No. IBM isn't sponsoring a golf tournament. A spokesperson explained that IBM merely adopted golf as a creative theme for its ads, to justify promotional puns such as "exceptional value is par for the course" and "help keep a business out of the

rough. IBM launched this seasonal ad campaign while the Professional Golf Association (PGA)



A PGA representative said the sports association saw no harm in these "IBM PC Classic" commercials. "As long as they aren't trying to leave the impression that they are sponsoring a PGA tour event, it wouldn't affect us," said Steve Rankin, the PGA's director of

public relations We imagine, though, that some other computer makers-Panasonic, NEC, Canon, and Seiko-who do sponsor actual PGA events that bear their names, might feel a little teed off with IBM this season.



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PC UPDATE BY VIRGINIA DUDEK

NEW YORK - Innovative Software of Overland Park, Kansas has "totally revamped" its integrated Smart Software System. The system consists of a word processor, database manager, and spreadsheet that are sold together or aeparately. Version 2.0 features a built-in communications module and a time manager for each Smart program. Innovative hopea to rival many best-aelling programs and claims to have won many converts. "There are tens of thousands of these little babies out there," boasts president Michael Brown, who says his spreadsheet runa 2.5 times faster than Lotus's "Neanderthal" 1-2-3. Th Smart spreadaheet is also the largeat to date - 999 by 9,999 cells. Version 2.0 comes with a newly re-written manual and can access 3 extra megabytes on the AT by creating a RAMdisk. It also supports the 8087 and the IBM color printer. The programa were rewritten to use English commands that allow custom applications and macros, and also boast a sparse matrix data atorage fea-

ture that doesn't store data in empty cells. upgrade nonevative is offering a competitive upgrade nonevative is offering a competitive upgrade nonevative in the competitive Multimate, Mcadstar, dBASE, and Symphony can but the new system for \$489, and modules for 1910 each. Users must present proof of purchase to delers or directly to upgrade to the competitive of 31, 1985. Current Smart System owners can obtain updates through dealers or Innovative by presenting \$30 for new disks and upgrade the system owners are the system of the competitive of upgrade of the competitive of upgrade of upgr

Microsoft's 71ight 51sulator Version 2.12 now aupports the Hercules Graphics Grad from Hercules Computer Technology in Berker adapter. (Version 2.12 is compatible with the EdA card but doesn't take advantage of the extended graphics; it seemly openies if the standed graphics is marry openies. Fig. 10 in 1

proof of purchase, and \$10 to Microsoft in Bellevue, Hash. Buyers after April 1 can send the coupon to recaive a free update. No word on the rumored jet version. After 3 years

of labor, Hercules is celebrating Flight Simulator's compatibility with its graphics card. A free Flight Simulator

update is available to registered users of the Mercules Graphica Card who have the the Mercules Graphica Card who have the earlier version of the game. "Flight Simulator is the business user's toy," says Kevin Jenkins, Mercules president. A patch provides compatibility with the card. For game veraions bought before Merch 1, 1985 send proof of purchase plus 510 to Mercules.

The new Version 2.0 of Magic Neru, as mean system from Deersoft, Inc. of Mel-bourne, Florida now has an audit trail feature that gives a history of specific files and programs used on a machine. Revisions in the contract of the contract o

Short takes Look for a version of Amhton-Tate's Framework to run on Inti's above and the same of the s

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Hayes Would Rather Switch

BY M. DAVID STONE

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its newest offering. The \$399 device defice seaw description.

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and two printers, for example, Huyes Microcomputer Products' Transet 1000

would serve as a printer buffer.

Send a file to the Transet at top speed (19,200 bps), and the sk at your computer.

Substitute a modern for one of the printers and the Transet turns into a communications buffer, sending files to your modern while you work with your PC. Similarly, the Transet plus modern can be an electronic mailbox, receiving and storing electronic mail even when

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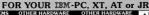
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A Boston Society Grows Up

BY DONALD P. FRAZIER

BOSTON-The Boston Comnuter Society (BCS) owes its preeminent stature to many factors: It's the largest microcomputer user group in the country (with more than 16,000 members), it's one of the oldest (started in 1977), and it's in Boston (center of the densest population of PC fans east of Silicon Valley).

It also has Jon Rotenberg. who becan the group at the tender age of 13 years-running it from his bedroom. He promoted it tirelessly, attracted members, rented offices, and convinced many of the industry's leading lights to come to BCS to find out what the people who use micros want in hardware and software. A successful appearance before BCS can make (an enthusiastic crowd gave Symphony a head start) or break (Coleco's ill-fated Adam wouldn't perform for them) a new product.

Testing the Waters

The group boasts members in 50 states and 20 countries, a stable of 30 publications, board members from the biggest companies in the business, and 44 subgroups on special interests ranging from the IBM PC (7.500 members) to computers in publishing (20 members).

So far BCS has not taken part in the current trend for user groups to act as advocates for micro consumers. This is no mistake, Rotenberg says.

"Ralph Nader, we're not." Taking a firm position on such matters as ADAPSO's attempt to create standards for hardware-based software protection, Rotenburg says, would hurt more than it would help: "All extreme positions are uninformed." Instead, Rotenburg views BCS as complementing the microcomputer industry.

"The best thing about the Society for companies is that it offers free market research about the needs of users. It provides a nonconfrontational forum where they can test the waters. present not-quite-finished ver-

the users are saying, and act accordingly."

Tough Customers

BCS's impartiality is essential, Rotenberg says, if the group is to fulfill the market research role. "People who come here know that we can be a tough audience, especially if



"In an atmosphere of dialogue all parties can realize that harmony is in their own self-interest."

-Jon Rotenberg

copy protection schemes can

complicate their efforts to share

software among several work-

ers, either on a local area net-

work or on a multi-user system.

To avoid this complication,

they said, they would rather pay

Companies planning new

products, Rotenberg says, fre-

quently consult one or more of

the BCS subgroups for mem-

bers' initial reactions. "Compa-

nies receive the publications:

a site-licensing fee.

they've got some explaining to do, but they also know we'll be

To keep speakers to the point. Rotenberg imposes some strict standards: be brief, no technical jargon, no corporate cheerleading, and especially, no PR spokesmen. "We want only the

brass here," he says. Asserting that a few vendors have at times hard-wired machines to impress the public in places such as trade shows. Rotenberg says BCS officials inspect machines at new product presentations to make sure they actually do what they're supposed to do. These guidelines benefit both members and vendors, Rotenberg claims. He says that MicroPro International, for example, recently removed copy protection from its popular Wordstar 2000 as a result of a BCS session. "They had a cadre of people in the aisles, all taking down com-

ments about their software and how people use it-especially At that session, he recalls, aniona users in business said that

people in corporations.

their employees belong to the groups. They know they'll be treated fairly.

Debatable Issues

BCS also fosters controversy. "Many of our programs are debates between people with often very divergent points of view. For example, on the issue of software pricing we'll have Adam Osborne (who now sells low-priced software) versus someone marketing a \$595 package. We'll have Phillipe Kahn (head of Borland International, vendor of SideKick) debating the people who wrote Spotlight on what desktop management software should do." Most of the debates are spon-

sored by the individual subgroups. "The individual committees often have a much better idea of exactly what their members need." Their power, he says, has helped BCS reconcile the present demands of the large, diverse organization with its past as a hobbyist group.

The smaller groups also help the organization steer clear of issues that could but its regula- more businesslike."

tion for impartiality. "We tread a very fine line, but the various user groups are always free to respond to their constituencies in ways that might be inappropriate for the Society as a whole," Rotenberg says,

Incorporating Business

Rotenburg cites the example of the largest subgroup, the IBM users, many of whom belong to large corporations. As Rotenburg points out, these members tend to be more interested in business-related issues regarding the use of micros in a corporate environment than are members of other groups.

The cooperation of BCS members, he says, could help the micro software industry head off confrontation over such issues as software protection and pricing. "In an atmosphere of dialogue all parties can realize that harmony is in their own self-interest.*

As BCS continues to grow and do more things, Rotenberg does not foresee it joining forces with other user groups across the country to advance joint concerns. Instead, he envisions his group, which already has nine satellite groups in New England, becoming a national service organization, thanks to the growing popularity of its national magazine, Computer Update: its electronic bulletin boards: its on-line information services; and electronic mail. "We could perform the same role for the microcomputer world as AAA does for autos."

The success of BCS has had another welcome outcome for Rotenberg: amazement at his youth has subsided. In his early days building BCS, he recalls, industry figures and the press were astounded that a highschool kid with braces could be one of the more-influential figures in the micro business.

These days, he says, people notice, but they don't care so much. Graduating from college a few years ago helped; so did his recent twenty-second birthday. "I once thought I'd have to put gray in my temples or something." Rotenberg says, as he recalls his efforts as an adolescent to make his voice sound

"How did we become the LAN standard in business applications software... With a little help from our friends.

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packages. Ed Weislow Project Director

CBS Toys

it must be uncomplicated.

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We look forward to adding more integrated packages to further streamline our workload."

Donna Griesemer Assistant Treasurer Spic and Span, Inc.

And, of course, it must be affordable. "When we decided to computerize our accounting, we evaluated various minicomputer systems and found them to be cost prohibitive. We consulted Price-Waterhouse (see Price-Waterhouse article, this issue of PC) for an alternative. They suggested a local area net-

After a thorough investigation we selected Macola Financial Software running on the

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our needs for a fraction of the cost of the mini-computer

alternative. Robert F. Steel President

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this LAN-Standard manufacturing,

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PARITY CHECK BY STEPHEN MANES

Unhandy Wipes: Installation Programs 1985 Style

You rip off the shrink wrap, slap the disk into the drive, type IN-STALL, and spend 15 agonizing minutes answering questions you don't entirely understand. Finally, you reboot

As the screen lights up, you gaze stupidly at an unfamiliar set of opening messages that take you straight to the heart of your new Duzitall package. Exiting to DOS, you confirm your worst suspicions. The AUTOEXEC.BAT file you've meticulously refined for months has vanished from your hard disk. In its place is an utterly useless changeling that doesn't bother to set up your RAMdisk, read your expansion card's clock, or even change your DOS prompt. It sure does zip you into Duzitall, though. Hope you've got a backup for

that missing file. You're a victim of installation, 1985 style.

Teeth-Gnashing Affair In the days of weird CP/M machines, software installation was a romantic, teeth-gnashing affair that required you to know such things as the band rate and cursor positioning sequences of your terminal. In particularly frustrating cases you had to hire somebody to rewrite your machine's BIOS. From terminals to COM ports, every hunk of hardware was defiantly nonstandard; the goal of installation was to make the software get along with it somehow.

The plain-vanilla PC made installation simpler. You formatted a disk, you copied a bunch of files to it, and you were off and running-at least until you decided to print something, at which point it might take a half-dozen phone calls for some help in getting your

Nipponwriter to make the appropriate loud noises.

Times have changed. PCs come floppy and hard, big-

RAMmed and small, color and monochrome, fast and faster. Installation programs tailor your new software to your machine and your whim as you respond to on-screen messages. And that's just dandy-when they work.

Shoved Out the Door More often than not, they

don't. The installation program shares the fate of the manual.

> Installation programs tailor your new software to your machine and your whim-when they work.

Both have to be developed at the same time as the master program, but neither can properly be finished until the program is in truly final form. In the real world that means that both manual and installation program get shoved out the door in a big hurry to avoid any additional delay in the already oft-postponed re-

From that pressure cooker many installation programs emerge tasteless and limp. Aesthetics suffer first. Installation programs rarely take advantage of color. They often (see WordStar) run like a tortoise on a treadmill. They may (see Side-Kick) make you respond to a hundred prompts when all you want to do is change a single item. And they may even leave out important options stuck into the master program at the last minute. You can use GEM even if you don't have a mouse, but bad sectors and sneaky directories keep you from making usable copies with anything but the program's own utility. SoftGuard and similar schemes stick hidden files in funny

one-and which model.

Copy protection invariably

makes installation even

weirder. Instinctive proce-

dures-stick program disk in

A:, blank disk in B:, type

DISKCOPY A: B:-may do

nothing but waste time, since

Loads of Laughs

places on your hard disk. They're loads of laughs when you're trying to reorganize a disk: you can't FRASE them and DOS won't let you remove a subdirectory with even a sin-

gle file in it, hidden or not. At that point you're likely to become acquainted with Peter Norton's WIPEFILE utility-or reformat the entire disk.

Considering that the installation program is the first thing a new customer sees, you'd think a software firm would use it to put its best foot forward. More often it stubs its toe. A new outfit peddling cheap software via modem sent me a disk whose batch installation file copied SYS.COM from the DOS disk to the working disk in an utterly vain attempt to make the disk bootable. For want of a drivespec the batch job ended with a bad command or filename error instead of running the rest of the you still have to tell the installainstall tion program which,



once I got into it, kept producing funny characters when I hit the arrow keys. This didn't give me much confidence in the firm's software offerings.

Self-Defense

My first circle in software hell, however, is reserved for programs that insist on overwriting files they know are there: namely, CONFIG.SYS and AUTOEXEC.BAT. Just using the primitive programming language available to DOS batch files, there are plenty of ways to find out if such files exist and append your stuff to them. I've seen them used precisely once-incorrectly.

In such a cruel world you simply have to defend yourself. Before installing any program, TYPE out any . BAT files on the disk. If the program invokes some sort of auxiliary installation program, you may not be able to tell what you're in for, but a line like COPY AUTOEXEC BAT C: sends a

warning of horrors to come. Whether or not you see such a line, don't fail to copy your existing AUTOEXEC.BAT file to a backup for safekeeping; you'll almost certainly end up needing

it. The same goes for CONFIG.SYS. You've probably set the buffers and files to something other than the default values (What? You haven't? Shame on you!), and dollars to donuts the new program will wine your settings out.

More bad news: Your installation travails probably won't be over once you get the program up and running. Sooner or later you'll want to modify one feature or another and you'll be faced with the whole procedure again. Installing Chivas Regal first may nelp.







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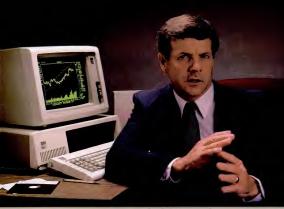
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THE SHORT REPORT BY PHIL WISWELL

Top-Notch Tools for Data and Time Management

Xtree

If you spend a lot of time managing files and subdirectories on a a hard disk, you'll appreciate the powerful convenience of Xree. If the program were not already subtitled "The new standard for file and directory management," I would have described this wonderful new utility the exact same way. In a matter of days Xree has redefined my relationship with my XT's hard disk.

The first and most remarkable feature about Xtree is not its ability to log onto any drive and list all files and statistics. but its graphic representation of the tree structure of disk directories. Moving the highlight bar to any branch on the tree yields an instant listing of that directory's files and stats as well as the DOS path to it. The command menu lets you perform lots of tasks on single or grouped files-change attributes, copy, delete, rename, view contents-as well as on the disk itself. To make a new directory, you simply position the highlight at the desired level on the tree and type M. In the jungle of computer files, it's easy to stay on the right path with Xtree (Executive Systems, Inc., 15300 Ventura Blvd., Suite 305, Sherman Oaks, CA 91403; \$49.95 plus \$2 handling; for PC, XT, and compatibles; requires 256K RAM, DOS 2x)

Time-Keeper

Time-Keeper is the best calendar/appointment scheduler
I've seen. It is easier to use and
more flexible than IBM's Time
Manager, and it includes an sudio cassette tutorial that will be
invaluable to beginners. You
synchronize the tape to the automatic disk tutorial, get comfortable, and watch and listen to an
excellent tour of each feature.
Between sections you can try
out what you've learned.
The top of the screen always.



Executive Systems, Inc.'s Xtm



DunaSoft's Time-Keeper

shows the time, the week of appointments being displayed. and the name of the calendar in use. Function key's provide simple access to any section of any calendar, which can be displayed as a weekly Gantt chart showing scheduled hours or in traditional format showing scheduled days. Below this are five information fields for appointments. A powerful search feature examines 350 records per second for selected criteria or openings for future appointments. Each calendar can contain about three events per K of system memory. Time-Keeper (DuraSoft, 7210 Washington Ave., New Orleans, LA 70125; \$195.00 includes handling; for PC. XT. AT. and compatibles: requires 192K RAM, DOS 2.x).

Fact Cruncher

The purpose of idea processing and outline generating software is to impose a structure on your thoughts so that they are presented in coherent order. Fact Cruncher does this and more but in such unconventional style and with so many commands that the end results don't justify the means.

Fact Cruncher (InfoStructures, Inc., Box 32617, Tucson, AZ 85751-2617; \$295.00 plus \$55 handling; for PC, XT, AT, and compatibles; requires 256K RAM, DOS 2.x) contains not one, but three different editors for the three types of files used by the program—outline, text,

and data files—and to benefit significantly, you must learn to use each editor. Even after reading the manual twice and following the examples of the tutorial files, I still hadn't grasped why so many commands were necessary to manipulate an outline structure. Fact Cruncher is a powerful tool but one that doesn't fade into the background as it should. Give me a product like ThinkTank any day.

I Ching

Now I've seen everything. The 5.000-year-old Chinese The Book of Change: I Ching is available to answer the key questions of life through your PC. For centuries, the Chinese have consulted this "oracle" by casting two-sided sticks or coins to form one of 64 random patterns made of six stacked solid and/or broken lines, called hexagrams, each of which is associated with a passage of text. To consult the computerized oracle, you type in a question such as, "Is this a good time for a ca-reer change?" Then the computer randomly generates a hexagram on the screen, followed by several passages of text.

In practice, you can't expect to analyze the stock market with The Book of Change: I Ching because there is no such thing as a black-and-white answer, no matter what the question. The manual cautions that you will have to derive your own mean-

ing from the oracle's responses, just as you would if you were using the book inteff. In fact, there isn't much difference between the book and the software, unless you care to be authentic. (Software Country, 270 N. Canon Dr., #1297, Beverly Hills, CA 90210; \$39 95 plus \$3 postage and handling; for PC, XT, and compatibles; requires 64 RAM, DOS 1.0).

Rank and File I

Rank and File! Is a filing program that rivals the get-up-andgo simplicity of PF3: File and PF3: Report. Setup and operation are meau driven and clearly defined by good documentation. Rank and File! imposes no limit on the number of files. You can use 65, 500 records per file. 250 fields per record, and file. 250 fields per record, and how the proving species! I counted 10 seconds to move through 100 records manufact.

However, there is a major limitation to Rank and File I. You can sold fields to an already designed form, but you can't delete or change existing fields. This program shines brightly in many respects, but when you need to redesign, and you will, Rank and File I eclipses itself. (RAF Software, Inc., Box 32318, San Antonio, TX 78216; \$160 plus \$5 handling for PC, XT, AT, and compatibles, requires 128K

RAM, DOS 1.x).

BY WINN L. ROSCH They're the computers of choice for CIA agents, Space Shuttle passengers, and soldiers engaged in war games. More than just another briefcase computer. the GRiD Compass, and now the GRiDCase, may be the machines you're most likely to find hard at government work.

looks like the all-American boy grown up. In a low, businesslike tone, a tone probably more appropriate for discussing top secrets with generals, he talks about his job, his company, and its products

The secrets he shares, however, run more along the lines of corporate rather than military strategy. Among them is the

Without the

pass, he helped in the early marketing of the machine. He joined the company shortly after it was founded in 1980 by John Ellenby, who had left the Xerox Corporation's Palo Alto Research Center. "I started the same day the payroll did, Margerum notes, and working with investor, now GRiD chair-

man, Samuel J. Wiegand, he helped develop the market-positioning plans for the not-yet-existing computer. The initial plans called for a portable adjunct to larger sys-

tems, a business machine that could take a chunk of a corporate database and digest it as necessary while roving in the field. "The desktop application was known," Margerum explains. At

the time, business had already discovered the Apple-VisiCalc combination, and the IBM PC was near announcement.

"We recognized the next step was the portable. We knew computers were going to be like adding machines and would progress from desktop clunkers to portable units. If you have all the functionality you need and can take it along with you.

you'd buy the portable. A speaking engagement at a federal office automation conference in early 1982 changed his perspective on his compa-

ny's fledgling product. "At the conference, I talked with a three-star general who had discovered that Apple computers gave him information that he had never had before.

Margerum explains. "Ours intrigued him more because it was a 16-bit machine and one that could be carried into the field."

The general's ideas, in turn, intrigued Margerum, and he took a new plan of attack back to company headquarters. The re-

ception was positive but a bit skeptical, and Margerum got a I-month assignment to find out whether the military market was real or not. He's been working with the government ever since.

Graduating from Princeton with a BS in Engineering in 1973, at the time a new degree designed to give a businessslanted engineering overview, he did the obvious thing and joined IBM.

The Worm Turns

From Big Blue he went back to school to get his MBA from Stanford Business School. Stanford taught him the smallcompany philosophy. "At IBM, you get a worm's eve view of the world," he notes, "When you work in a small business, every decision you

make is important. After graduating he joined a smaller firm, Epsilon Data Management, a marketing consulting company, where he served as assistant to the president. But he was still lured to the computer industry. Consequently, he moved to a smaller computer company-Apple.

There he was in charge of the marketing of business-oriented software for the Apple II. Later he moved over to the fledgling Lisa project when it was little more than an idea, conceived as a follow-on to the Apple III. He left Apple for GRiD with Dave Paulsen, who handled much of the original hardware design for the Compass.

The choice proved to be a wise one. While other PC-compatible makers come and go with fanfare, glory, and alarming regularity, GRiD Systems has quietly played its own game, out of sight but hardly out of play and profitability. A privately held company, GRiD has avoided both microcomputer analysts and financial headlines while quietly carving out its

With Margerum working with the Pentagon, continued success seems assured. And Margerum is blessed with a salesman's dream-a big. stendy customer whose checks will never bounce.

own market niches.



The GRiD computers are the only briefcase models that meet

the stringent Tempest security

level and are the first to meet the

government's COMSEC com-

munication secrecy standards.

But without the insight and hard

work of GRiD vice president

Barry Margerum, Uncle Sam

might never have packed a per-

sonal computer in his old kit

GRiD's defense-industry mar-

keting program, and he proba-

bly could be called the man who

took the personal computer

from a cusby desk tob and put ft

Clean-cut and Ivy League, he

into frontline action

Margerum is in charge of

Barry Margerum. Uncle Sam night never have packed a personal computer in his old kit bag.

story of how the GRiD computer earned its stripes. Commanding Officer

Though you'd think that the GRiD machines were designed with the military in mind because of their armorlike magnesium cases and their no-nonsense basic-black styling. GRiD's lock on the government market was not tailor-made but grew instead from canny marketing of the already existing product. "When we built the product, we had no intention of being a military supplier," says

Although Margerum was not a designer of the original Com-

Mannerus:

HOW TO BUY SOFTWARE WHEN ALL THE ADS LOOK THE SAM

e know it's hard to choose a software house. All the ads say the same thing-"Lowest prices," "fastest delivery," "best support," "biggest inventory."

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Bantam Books Hopes to Rule the Software Roost

BY CHARLES BERMANT
NEW YORK—Kenzi Sugihara

NEW YORK—Kenzi Sugihara brought six copies of Sherlock Holmes in "Another Bon" to a mystery bookstore near his Manhattan home as an experiment. Sugi hara, director of electronic publishing at Bantan Books, had developed the interactive tales as part of the company's first software product offering. To his surprise the little shop sold all six packages in less than a week.

than a week.

Bantam's software arm is now attempting to translate the publisher's strength in self-improvement and fiction areas into a software advantage. While Warmer Brothers, Simon and Schuster, and Harcourt Brace Jovanovich for which Sughan own that the strength of the software with the software and the software with the software and usefulness of their products will help turn Bantam into the cock of the software walk.

walk.

In addition to the Sherlock
Holmes adventure, a swordand-soccery epic is on the way.
A line of children's educational
programs and floppy disk versions of Know Your Own Personolity and The Scorosion
Medical Diet are also in the off-

ing. And that's just the beginning. Frederick Forsyth's latest novel is slated for a simultaneous paperback and disk release this fall. The Forsyth disk, developed by a British publisher, was described by Bantam software development manager Randi Benton as an "espionage spreadsheet."

Software Strut

Interactive fiction à la Bantam strives to emulate the author's own writing style, according to Benton.

Since few authors have a computer background, an author/programmer relationship that corresponds to the traditional author/editor is

is established.
"We want to create an experience that's unique." says
Benton. "We aren't developing
templates. All our works are
original. We do what is most
suitable for the particular work.
We'll look at each title and work

out a scheme."

Benton says author reaction
to the process varies. "We
haven't received any negative re-

In some cases, as with The cases, as with The cases, as with The cases are cases at its most works are at its most cases and work ince. "We people re-The idea is



Above: Bangam's Kenzi Sweihara and a screen from The Complete Scarsdale Medical Diet

aged together. With separate sales, Bantam expects to advertise the software for the corresponding books but not the other way around. A consumer who has bought the software is already cognizant of the book from which it came, says Sugihara, adding that the software is designed to complement rather than

compete with the printed-word

Scorsdole Medical Diet, the

book and the disk will be pack-

package. Benton says that anything is possible in the infant media. The "most appropriate" titles will be offered in the future, and she expects to draw from a list of respected authors and books. The most successful packages, she feels, will be tied in to authors already in the public eye. Once interactive software becomes more popular, authors will embrace the concept. For now, self-help books are the most easily adapted market.

"Authors of this type of book write in a personable manner," she says. "In much the same way they would speak to someone in a one-one situation. They speak to individuals instead of to the masses."

MLA Gives Top Grade To Dragonfly Software

BY STEPHEN MANES

NEW YORK—Dragonfly Software has won the endorsement of the prestigious Modern Language Association (MLA) for its academically oriented *Nota Bene* word processing and "text-base" management pack-

According to deputy executive director, Hans Rüttmann, the MLA, "considered the leader in the application of technology to the humanities," will market the program directly both to its 26,000 members, English and foreign language professors, and to members of related organizations.

"One of the hardest things to get out of the MLA is an endorsement, and this is the first computer program we have ever endorsed, "Rûtimann says. Before acceptance, the program got the same careful scrutiny a scholarly manuscript receives before publication.

"We maintain the most comprehensive on-line database for humanities research and our offices and bibliographic services are computerized."

Rütfmann's assistant, Eileen Silver, laments the fact that until now, as she says, the academic community has really been ignored by software manufacturers. "Our members would phone us out of exasperation with computer people who didn't understand their needs for bibliographies and indexes."

Silver says Noto Bene, however, addresses the needs of

MLA members in a way that no other program has. "It's for the person who's creatively writing at the computer, not the secretary who is handed material." she says. According to Silver. not only is Noto Bene's word processor fast and unobtrusive, but the "text-base" manager, which permits sophisticated searches for particular words or groups of related terms, exploits the power of the computer to index notes and bibliographies. "It takes a lot of the drudgery out of the researcher's work.

Dragonfty's marketing director, Deborah Reumann, welcomes the MLA's support. "It has really helped keep us going, and we're very excited about the endorsement. So far, we've developed our network of dealers mostly through academics who have spread the word about Noto Bene. Now this recognition from the MLA is bound to generate even whele interest."

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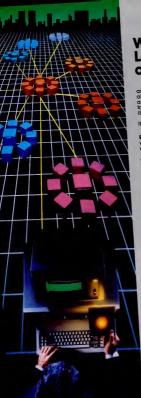
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DOWN TIME BY WINN L. ROSCH

It's a Plotter, a Printer, A Ballpoint Typewriter

That fine line between genius and insanity bulges like a freshly fed boa constrictor when it encounters the Panasonic Penwriter—a machine that I can revere for its ingenuity but one that at first thought strains your
credulity. Described simply, the Penwriter is the world's first

ballpoint typewriter. That's right. Rather than pecking characters onto paper with dot matrix hammers or daisywheels, it draws them with four tiny ballpoint pens. Amazingly, the end product looks very close to typewritten textcomplete with serifs-and it's better than the output of most correspondence-quality matrix printers. Better yet, the Penwriter includes word-processor-like features such as an editing window, word wrap, and a search function. And the Penwriter can wield its pens to draw regular and bold fonts in italic or roman characters, all in three horizontal sizes and three vertical sizes, that can be mixed for condensed or expanded

The engineering talent that went into this device astonate, went into this device catonate, went into this device catonate, and correspondingly cheap, dum-type plotter. The rubber type writer-style platen shifts the paper up and down while the pen-cum-prinited moves back and forth and a long lever lifts and lowers the pen-cutally a circle of four pens on a rotary shifter that allows the Penwriter to scribble in red, green, blue, and black.

Double Life

More than merely another light-weight, battery-powered (six C-cells that seem to double its 5½-pound weight) porta-

mechanism can double as a selfcontained plotter using its own built-in drawing firmware (software encoded in ROM). Select one of several graphing styles from a few extra keys and you're led through a menu of options on its two-dozen-charoptions on its two-dozen-char-

acter LCD screen.
First you have your choice of three chart sizes; then the machine asks you to type in the required numerical data. When you're done entering numbers, the Penwriter automatically scales your figures, then draws scales your figures.

modest 300-baud preset speed, however, the Penwriter can't keep up with serial data.

Adding frosting to injury and insult to the cake, I found no instructions in the box with the

structions in the box with the machine and can't for the life of me figure out how to control the plotting function from my PC (if, indeed, it's possible) to make this thing a useful computer-controlled graphics tool.

puter-controlled graphics tool. With the benefit of some form of instruction, the Penwriter could be an acceptable, although boringly slow, low-



so doing, the wise engineers created a second-rate typing machine—because of the bias of typewritten text.

The Penwriter has even greater capabilities: It could be the first typewriter that can actually write a letter, with precise and elegant flowing script, better than the best monastic script, and you can choose ornamental characters or a grapevine twining up and through the text.

The Penwriter is intriguing. Ostensibly a pure hardware product, it might just eliminate the need for a PC for people who do nothing more than prepare memos and reports. For little more than the cost of the pair of admittedly inexpensive IBM Assistant-series software packages that would handle the Penwriter's two principal chores-word processing and graphing-it gives you hardware with the same functions built in, albeit in more rudimentary form.

afraid that's exactly where PCs are headed: soon to be swallowed up by a myriad of other machines. Someday every home will have a dozen computers, but they'll be licked inside Penwriters, microwave ovens, and toothbrushes. In fact, if the Penwriter were only a little smarter and a little faster and had instructions in the box, I would be worrying if I owned IMM stock.

Looking at the Penwriter, I'm

More than another lightweight portable typewriter, the Penwriter can double as a self-contained plotter.

and labels the graph—in up to four colors, of course. Before drawing anything, the machine gives you the option of positioning the graph anywhere on the sheet and even traces out the area it will occupy—with the pen up—so you can see whether the artistry will fix your

valuable piece of vellum. Slow Hand

Alas, you won't find me using the Penwire regularly for
real work because it's just plain
slow. Even when my typing fingers aren't outracing my
thoughts, I have to pause at the
ends of lines or paragraphs (the
Penwiret has a 'Ailobyte character buffer) to let its scribbling
little fingers catch up with me.
The only typists who will really
appreciate the Penwirter as

those who get paid by the hour.

To compound the misery of slowness, you can connect the Penwriter to your PC using its built-in serial port. Even at its

budget, four-color combination printer/typewriter. If, however, it understood a common plotter language, like HP/GL, then I would whotheeartedly recommend it as a rock-bottom plotter that's almost as good a do-anything tool as a coat hanger.

Culture Bound If the Penwriter were only a

poor printer, however, we could pass over it with quiet laughter and never give it a second thought. It deserves better than that, however.

The machine is a symbol, embodying a cultural bias that we all suffer from, one that even festers inside the wise Japanese engineers who created the machine. It's easy to hazard a guess (and much more difficult to be right) that the Penwriter was created to draw Kanji or Katakana characters and was translated into the Roman al-

phabet to sell in countries that

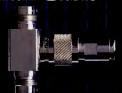
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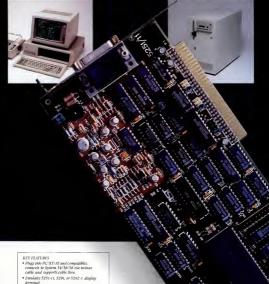
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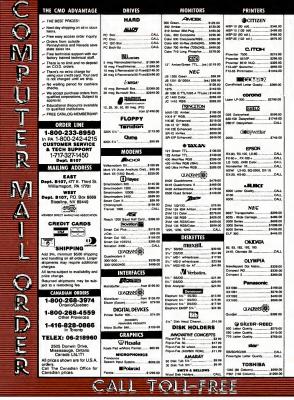
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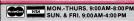






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Celebrating Local Shows

Put together by committed individuals using volunteer labor, local computer shows create a common meeting ground for interested parties and often abound with bargains.

uick-name the longest-running personal computer show. COMDEX? No. that's a new comer. The West Coast Computer Faire? Wrong again, It's the Trenton Computer Festival. The what?

The Trenton Computer Festival. It began as the Personal Computing '76 Consumer Trade Fair in Atlantic City, New Jersey. The original was sponsored by the Southern Counties Amateur Radio Association, Chief organizer John Dilks, as far as 1 can tell, invented the term "personal computer" -- for which IBM, PC Magazine, and countless others owe him a debt of gratitude. John is still involved in the festival Radio amateurs are still there in force as well. Their cars and vans bristle with antennas, and they roam the events carrying hand-held transceivers:

Ted, they're selling 51/4-inch floppies for 45 cents each in row 3. How many do you want?"

The TCF was then, and still is, a hobbyist's show. A good many hobbyists are still highly incensed at IBM for having expropriated the term personal computer, which used to mean any machine that more or less fit onto a desktop for individual use. (The less prestigious term microcomputer has now taken its place.) There is still a strong contingent of hobbyists that hate the conformity created by the sheer numbers of IBM PCs. They view the mass acceptance of the PC as a lemming-like act-a mistake, a rejection of better, more sophisticated machines-although some of them have sublimated their feelings well enough to

make a buck off the PC market.

Trenton Computer Festival is now held under the auspices of The Amateur Computer Group of New Jersey and Trenton State College on the school's graceful, suburban campus. It now at-



tracts 10,000 people a day to the commercial show, seminars, user-group meetings, and flea market.

And oh, what a flea market it is! Want to build up a Decsystem or a Univac 1100 from parts? You could do it here. Want a couple thousand memory chips? Step over to the trailer and we'll cut a deal. Half-height disk drives are \$60 new, \$10 used. Preowned computers and components of every stripe abound. S-100 cards and systems sell for pennies on the original dollar. Expansion boards you would have killed for 5 years ago are coveted more for their gold contacts than their functions. At any moment you can see

dozens of customers with silly grins walking away, arms straining to carry cardboard boxes brimming with junk.

Things are not much different in the commercial exhibit hall. Next to a PC AT running a sophisticated Autocad application is a Radio Shack Color Computer with hardware and software to track any manmade or celestial object. A young man taps a few keys and a menacing antenna array swings about, then locks into place. Several booths are selling PC-XT motherboards for \$500 AT motherboards are available for \$1,000, cash and carry. Shoehorn the board and drives into a case, and you can have a roll-your-own PC AT for about \$3,500. There's a huge Apple-and-education display put on by one of the region's retailers, CompuServe is showing its wares on a brace of PCs, and the new Atari ST is making its East Coast debut.

Recapturing History

TCF was 10 years old this spring, and one of the mementos handed out at the awards banquet was a reprint of the original show program. Some familiar names emerge from that historical document. David Ahl, the editor of Creative Computing, was on the first speaker panel. So was Neil Colvin. Neil's topic was "Software Concepts for the Hobbyist." Now Neil heads Phoenix software and devises all those swell BIOSes that virtually guarantee instant IBM compatibility. A couple of guys named Jobs and Wozniak were at that first show. They couldn't afford booth space, and so they showed the Apple I in their hotel room. Just down the

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EDITOR'S SCREEN

aisle from Itty Bitty Machine Corp., IBM was touting the \$100 as its contribution to desktop computing. Roger Amidon was showing the Zilog Z-80 as a "third-generation" microprocessor.

Dan Fylstra, late of VisiCorp, was proposing a standard for a common machine language that would operate across many different processors. I'd love to bore you with more semifamiliar names, but in-

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stead, I'd like to contrast this show to spring COMDEX.

The Contrast to COMDEX

The Computer Dealers' Exposition is held each spring and fall (the less said about winter COMDEX, the better) for manufacturers to show dealers their latest wares. Many corporate MIS and data processing people attend, as do end users. They come to keep abreast of the state of the art and often make future purchasing decisions based on new products announced at the show.

Everything at COMDEX is commercial, arranged by the pros and executed at union scale, double overtime. Everything at a local show like TCF is volunter labor, the work of committed individuals. Once you've been to the big shows like COMDEX or NCC (the National Computer Conference), it's all too easy to look down at the amateur shows. I've even heard the term "end-user show" used disparagingly.

Well, folks, it's about time we wise up to the fact that computers are not an end in themselves. Without end uters there wouldn't be DP and MS departments, let alone computer manufacturers and dealers. All those hackers and digit heads who frequent the local shows also happen to be some of the most critical was the same of them and to the computer and the same of them and to the property of themselves and the same of them and to the property of the major themselves and the same of them and to the property of the same of them and to the property of the same of themselves and the same of the

Do you have the feeling that your computer could be doing more for you? Are you feeling a little stale and one-dimensional in your job? Who're you gonna call-the director of MIS? You'd be a lot better off if you hiked on out to a local user group meeting. You'll find a gaggle of special-interest groups dedicated to the programs you use and the problems you need to solve. You'll find businesspeople, students, engineers, and educators. You'll find open minds, diehards, blowhards, learners, and experts. You'll also find a common thread: love of the computer, not for itself, but as a potentiator of human thought.

You'll also find more than a few people there who have heard of the Trenton Computer Festival.



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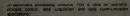
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Designed with extensive file security feature. QNX 2.0 provides login protection with network wide file permission checking based on 255 groups of 255 users. In addition, each PC user may control network access to device

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The QNX LAN supports distributed processing as well as distributed devices. Tasks may be executed on rende stations as easily est hely may be executed on the local work station. This allows pure processing elements (PCs without authorities per largelyst) to be plugged into the network to be itsed as an



QNX supports a full implementation of X.25 allowing connection to public networks such as Telenet and Detaper. This ellows you to link geographically separate LANs together providing true global area networking.

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Letters to PC

Update on Upgrades

The "PC Update" column in the May 14, 1985 issue of PC (Volume 4 Number 10) contains some information on the new version of EasyWriter II recently released by Sorcim/IUS. There are some inaccuracies in that column that I would like to correct.

Virginia Dudek states, "Registered EasyWriter II users can send \$50 and an old disk to Sorcim/IUS to get Version 4.1." This is not completely correct.

To upgrade to Version 4.1, registered users should send all the original disks from their EasyWriter II package. The price of the upgrade is \$129 to go from EasyWriter II Version 2.0 to Version 4.1. shipping not included. For users upgrading from Version 4.0 to Version 4.1, if the earlier version was purchased prior to March 1, 1985 the upgrade is \$40. If the earlier version was purchased prior to March 1, 1985 and you have proof of purchase, there is no charge for the upgrade to Version 4.1.

The \$50 upgrade price quoted in the article does apply to upgrades to Version 4.0 of the Easy Business Systems Plus products (\$50 per module). Version 4.0 of EasyWriter II is no longer available

since the release of Version 4.1. Further upgrade information can be obtained from Sorcim/IUS at (800) 223-9760 if outside California and at (408) 942-0771 from within California.

> Leanna Gaskins Sorcim/IUS Micro Software San Jose, California

Tandy Persuasion

I enjoyed Winn Rosch's review of the Tandy 1200 HD computer ("The Tandy 1200 HD: A New Direction for Radio Shack," PC, Volume 4 Number 7).

However, several facts were in error. The machine holds the 51/4-inch disk drive on the left side of the computer and the 10-MB hard disk on the right side of the computer, as clearly shown in your very slick and professional.

photograph of the machine.

MS-DOS and GWBASIC are not included with the machine. Since some of the programs I purchased required BA-SIC to run. I know this was the case. I have found no compatibility problems with Home Accountant, the PFS:



Also, careful shopping let me buy the machine for \$1,000 off the regular price during the week between Christmas and New Years.

> Gordon McElroy Narberth, Pennsylvania

Winn Rosch replies:

I agree, At Christmas, Radio Shack's special \$1,995 sale price on the the 1200 HD made it about the best buy in personal computing. However, since then other suppliers have cut their prices, and I think better deals are available on other machines now.

My information about MS-DOS and BASIC came directly from Tandy public relations, which may view the world somewhat differently than your local dealer.

As to the confusion between right and left-I resolve to keep all politics out of my writing from now on.

Down-to-Keyboard Style

I am a new subscriber to PC and find it to be all that I expected-and then some. Not only is the content excellent, but the overall appearance of the magazine is

It was immediately gratifying to me, upon receiving my first issue, to find that my own machine-the Tandy 1200 HD-was favorably reviewed. For the most part, I subscribe to PC because I am a new hacker, and the magazine has aided my education in my new environment. As is probably the case in more and more instances, I felt that in order to stay on the proper side of the learning curve in my field (mechanical and electrical engineering consulting), I had to get into microcomputing.

After reading a few issues of PC Mag-

azine. I see that it must be hard to keep up the quality of the publication while trying to put out an issue every 2 weeks! I would think that in trying to meet the everpresent deadline, the format of the magazine might get too "locked in" because no one has any time for creativity. And then, guess what? This week's issue arrived, with new red banner heads over the articles in PC News. At first, I panicked because I couldn't find Stephen Manes's "Parity Check" column, but then I realized that I didn't like the new style. Say what you will, but there is just too much red for my taste.

Thank you very much for an excellent publication, down-to-keyboard style, and that certain something that now makes me feel like you really are trying to communicate to me, not just sell a magazine.

> O.J. Zuniga, Jr. Laredo, Texas

A Visual to Go

As an owner of the Visual Computer, 1 was eager to read Roland Racko's article "Computing on the Run" (PC, Volume 4 Number 6). Many of his points were well taken, yet I would like to point out some of the improvements that were made since the article was written

The LCD screen now has 25 lines, and the flicker problem has been corrected. I have found the display quite adequate for



FASTBREAK speeds up 1-2-5 recalculations by up to 36 to 1 on A77 MHz PC and 197 to 1 on a NUMBER SMASHER Requipmed PC. It redends DCS functionally to include the 8087 and conserved in a daughterboard which this tind to 8087 scokes an 8087; a feature as a 1000 and to 1000 and 1000 a

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LETTERS TO PC

a portable computer. There has been no problem running CAD/CAM using a digitizer or mouse.

The portable convenience is really great. Not only is it easy to pack up and move, but when not in use, it stands on its end on the back of my desk taking up only a small amount of space.



But the most outstanding feature is Visual Technology's service. When I called about a problem of a sticking key, the company immediately sent me a replacement keyboard. I also told the company recently that the fan was too loud. It had already corrected that problem in the newer units and again sent me a replacement fan.

> Joseph I. Jackson Bales Ferry, Connecticut

Balancing Your Life While I applaud your innovation in attempting "The Great Spreadsheet Face-

tempting "The Great Spreadsheet Faceoff," (PC, Volume 4 Number 11), I must truly question its validity if, in fact, Ray Hood of MicroTrek Enterprises, Inc. believes that "nothing ever balances in real life".

> Fred C. VanPelt Cincinnati, Ohio

The Future of Computing

First, I'd like to give PC Magazine a bit of praise. I have subscriptions to other computer magazines, and they do not compare to the quality and substance I find in PC.

Second, I have a suggestion for future articles. How about some articles on the general status and future of computing above and beyond the microcomputer. I would be particularly interested in the race for a next-generation super-computer. Micro's are getting more powerful, but I don't think that anyone would want

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to do meteorlogical modeling on one.

Much of the technology now being developed for state-of-the-art mainframes eventually trickles down to micros in some form. Also, the PC-to-mainframe connection is important to many users. Therefore, improvements in mainframe technology affect many of PC's readers.

Last, I would like to ask a rhetorical question. I have been keeping up with many of the recent advances in mass-storage technology for PCs such as high-density floppies and laser disks. What strikes me as odd, however, is that all of these technologies are based on some type of electro-mechanical clunking, clattering, whirling mass storage that operates much slower than the CPU they are intended to serve. What are the problems with bubble memory? Only one production-model PC (the GRiD Compass) uses this technology. The little work I have done using a RAMdisk has spoiled me on floppies and even hard disks. There ought to be a better way to approach this.

Cary D. Vick Reston, Virginia

Printer Upgrade

I just read John Dickinson's programming column "The Great Printer Swap" (PC, Volume 4 Number 5), which prompted me to ask the following question

I have an IBM PC and a Daisywriter printer. I would like to get IBM's DisplayWrite 3 so that I will have word processing capabilities. I have been informed that this software will not run on a Daisywriter. However, I have also been told that there is another program that would enable me to use the two together.

Paula Ziegler Ketchikan, Alaska

John Dickinson replies: Unlike Displaywrite 2, which only sup-

ports IBM printers, Displaywrite 3 can be configured to support any ASCII printer, including your Daisywriter. An interactive configuration program guides you through the process and works auite well.

I read John Dickinson's review of Micro-

PC MAGAZINE • JULY 23, 1985

soft's Word Version 2.0 in PC News ("A Better Word from Microsoft," PC, Volume 4 Number 9, p. 48). I just received my upgrade in the meil. I was green with envy when I read that Word supported the HP LaserJet printer "as if it (knew) every last thing about the machine."

I own the IBM Quietwriter and have been waiting caperly for Word Version 2.0, which Microsoft claims supports that printer. Well, what an incredible disappointment. Word does not even support the four current font cartridges that are aveilable. There is no support in particular for bold ps (which is a proportional spacing font). Moreover, Word has no option for switching between the cartridge installed in the "A" position and the cartridge in the "*" position. Word doesn't even have all of the correct type sizes!

And Microsoft has its usual amount of user nonsupport in Version 2.0 of Word. Vaughn F. Winchell Lexington, Massachusetts

John Dickinson replies:

"Guilty on all counts," according to a Microsoft spokesperson. The Word development team had only worked with a prototype Quietwriter printer (without fant cartridges) by the time Release 2.0 had to be shipped. They're working on an update, but if you can't wait for that, you can use the CONVPRD utility to modify the Word .PRD file to work with the cartridges you have.

Correction:

IBM's PC Pallette does not support a monochrome monitor as was reported in "IBM Masters Mouse and Menu Graphics." (PC, Volume 4 Number 2).

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Hot Tips à la Norton

Norton shares a few juicy morsels: WordProof II is good and cheap; A.T. Enterprises's crystals really rev up the AT; the ECD and Word make a hot combo; and ColorMagic takes advantage of EGA's changeable palette.

the folks in Boca Raton.

t's summertime. A perfect time to clean up the odds and ends on my desk and talk about a variety of tonics that don't call for a full-length column in their own right. Telling you new and exciting things about the PC makes writing this column fun.

First, a strong runner in the Bargainof-the-Year contest is IBM's spelling checker, WordProof, WordProof is fast, efficient, and pleasant to use. In fact, it has such a good editor built into it that some people use WordProof as their main writing tool rather than just as a spelling checker. Much can be said for using WordProof this way-after all, the best kind of spelling checker is one that's built right into your editor. Unfortunately, however, WordProof isn't a real word processing editor and can't do such simple things as reformat paragraphs out of ragged lines.

At \$60, WordProof had been getting a lot of applause as a real bargain, but now it's been unseated by WordProof II. at a remarkable \$40.

A Catalog of Bargains

WordProof II is so cheap because it's part of IBM's direct mail-order software operation, Personally Developed Software. You can get the latest catalog of this software by calling (800) IBM-PCSW. IBM can afford to knock a third off the price of WordProof because it doesn't offer expensive printed manuals for any of the catalog software (it's all on the disk), and it's cheaper for you because the conventional retail markup is eliminated when you buy directly from

If you have WordProof, you don't need to rush out and purchase WordProof II-the dictionary and the program's features are unchanged. At \$40, WordProof II is such a bargain that everybody else



ought to snap it up. By the way, if you use WordStar, you should buy the Star-Proof Bridge, which resolves the file incompatibility between WordStar and WordProof; it's also in the IBM catalog.

These cheap direct-from-IBM programs are just one sign of an important new trend over at IBM. In the old days. IBM products were sold at relatively high prices based on real (or self-proclaimed) quality advantages over the competition. It was called the "IBM price umbrella" and lots of smaller companies thrived in the shelter of IBM's high prices. This theory no longer works with today's competitors from the Far

East, who have plenty of engineering smarts and low labor costs.

These days IBM is spending tens of billions of dollars to make itself the lowcost producer in everything that it does. That's good news if you, like me, prefer to spend your bucks on IBM products. It's also good news for those who fear that America's computer industry will go the way of America's steel and car industries and this is bad news for IBM competitors, including Apple.

Also in the IBM program catalog is the Object Library Maintenance (LIB) program, which lets you create and edit space-saving object module library (LIB) files. It's included in most non-IBM versions of DOS but not in PC-DOS. Now you can get it for a mere \$20.

Weird Messages

Next on the agenda is a little quirk that I learned about by reading the interesting and struggling magazine Programmer's Journal. Apparently, a curious little message is built into the DOS command program RECOVER. In the DOS 2.x (but not DOS 3.x) version of RECOV-ER, if you respond to the program's safety prompt with the Control-W key combination, an interesting message appears: "Chris Peters helped with the new DOS! Microsoft rules OK."

I discovered another interesting message while snooping around in the TREED tree display program, which is a part of the Utilities II package that's also in the IBM program catalog. There I found the not-so-nice message "If you were supposed to have extensions on directory names, there would have been examples of it in the DOS manual!" I don't know of any way to provoke the program to display this message and, in fact both DOS and this TREED program

do accept directory names with extensions. Apparently, the program's author, Bob Flavin, was irritated and stuck this never-issued message into the program. Bob Flavin, by the way, is the same guy I mentioned in an earlier column who wrote a patching program called SPY. SPY has one of the nifriest ways I've ever seen for displaying its help messages: they scroll onto the screen and then scroll off while the main information scrolls back on. It doesn't sound like much when you describe it, but it's cute when you see it.

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Revving Up the AT

If you've got, or want to get, an AT. you ought to know how to speed up the machine (See PC News, PC, Volume 4 Number 4, page 35). A stock AT runs at a very conservative 6 megahertz, but you can turbocharge it by simply replacing its clock crystal. (Note: you can't replace the clock crystal in a PC or XT because the crystal that controls the computing speed also controls some other parts that have to run at their standard speed and no more.) It's become a common practice to boost the AT from 6 MHz to 8 MHz, and some people are even running their machines at 9 MHz. You might think that a stock AT, which is naturally about five times faster than a PC, is fast enough, but lots of folks find that another 1/4-speed increase is noticeable and very satisfying.

When I initially tried to boost my AT, I had some reliability problems. Now, however, I'm convinced that the problems were caused by crystals from Radio Shack that were made from the wrong

A stock AT runs at a very conservative 6 MHz, but

you can turbocharge it simply by replacing its clock crystal. Some people

run their machines at 9 MHz.

kind of lead (they were too thin and had
to be doubled over). I recently tried it
again with the proper crystals and had no
problems. If you're speed hungry. I rec-

ommend doing it.

One of the places where you can get speed-up crystals is A.T. Enterprises, P.O. Box 4795, Whittier, CA 90605 or call (818) 810-8443; the price is about

\$50 and includes a show-off testing program. The best part of this kit, however, is that it contains three crystals of varying speeds, so that if you have problems with the fastest speed or you're just worried or palette. By changing the actual colors that appear when a program asks for certain standard colors, it lets you override the color choices of nearly any program. You tell ColorMagic, in effect, that

"when a program asks for white, give me yellow; for black, give me dark bluegrey." Or whatever you want. At a surprisingly cheap \$40, ColorMagic renews my faith in the EGA and ECD.

Although it's not documented, Word lets you use the IBM Enhanced Color Display's

impressive 64-color

that you might be pushing the limit of your machine's reliability, then you can try a slower speed and still get some increase over a stock AT.

An Undocumented Surprise

For my final item, I want to explain onvo to get Microsoft Word, Version 2, to work with IBM's trazzle-drazzle Enhanced Color Display (ECD). Although it is not documented. Word actually lets of the color pattern of the color pattern of the color pattern of the color pattern of the microsoft of the mean of the window/options/background color list. But, then, instead of selecting from the 16-color list that's shown, you press the PgUp or PgDn key to move the color list. But the color list is the color list is the color list. But the color list is the color list is the color list. But the color list is the color list. But the color list is the color list is the color list.

I found a lot of nice colors such as a peach and a handsome mauve; but even though they may be nice looking they are not the best colors with which to work. For an actual working background color, I like the dark blue grey, which seems very easy on the eyes. Famed Word expert Peter Rinearson also chose the same color himself.

If you've got Word and an ECD and you don't try them together, you're missing one of the hottest combos on the PC stage.

More Colorful Choices

Another good program for Enhanced Graphic Adapter and ECD afficionados is ColorMagic, from Lifetree Software (the VolksWriter folks). ColorMagic takes advantage of the EGA's changeable col-



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CIRCLE 200 ON READER SERVICE CARD

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IBM Color Adapter \$244

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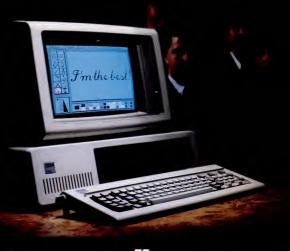
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COVER STORY

PCvs. MAC: AN UNFAIR MATCH?

Is Apple's Macintosh a serious contender in the business applications arena or merely a brash pretender to the PC's throne? Read on—the results of our benchmarks may surprise you.



DIANE BURNS AND S. VENIT

pple's claims aside, the Macintosh will never really replace the PC as a serious
business machine, right? If
you believe this, you're
probably one of the
many PC users who
have never really seen
or touched a Macintosh. Or maybe you formed this opinion before the 512K memory, hard disk drives, and
the many business software packages were
available for the Mac.

Today. Apple Computer is waging an accelerated earnpaign that is aimed at selling the Macintosh to business users. In the pages that follow, PC Magazine takes a serious look at Apple's claims and compares the Macintosh to the PC as a viable business machine. To separate the facts from the myths, we subjected these two major-league contenders to a series of tests with seven basic applications that are available for both machines; word processing, spreadsheets, database managers, business graphics, drawing, programming, and telecommunications.

Unfair to the PC, you say? How can we match the PC's 16-bit processor against the Macintosh's 32-bit configuration? Although you'd expect the 32-bit machine to run faster, you've all heard how slow the Mac's operating system is with disk I/O. And if you are accustomed to working with other computers, you may laugh as you hum along with the Mac's disk drive, waiting for files to open or close. Have you heard the one about how Apple provided these pauses to give you a moment for thought? Unfair to the

Macintosh, you say? How can

we put the 4-year-old child of a

giant in the same ring with a 1-

vear-old baby whose parents

started out in a garage? If

you've been thinking along

these lines, you may be surprised at some of our test results. Once we began, we honestly had to ask ourselves whether the PC is as "mature" as we thought it was, or whether it is actually becoming outdated? Is the Macintosh a fad, or is it the direction of the future? We've had to acknowledge, too, that 3 years ago the PC suffered from the same lack of software that now hinders the Macintosh, but this is a discrepancy that time will resolve.

Here's a list of the applications and related products that we compared:

Word P	rocessing
Microsoft Word	Microsoft Word
	dsheets
Lotus's 1-2-3	Crunch
Database	Managers
Powerbase	Omnis3
Business	Graphics
Microsoft Chart	Microsoft Chart
Dra	wing
DR Draw	MacDraw
	gnimm
Microsoft BASIC 2.0	Microsoft BASIC 2.1

Hayes's Smartcom II Haves' t Smartcom II

Wherever possible, we used the same manufacturer's software on each machine. We found, however, that a package with the same name and manufacturer does not necessarily mean the same product. Sometimes, for example, handy features implemented for one machine were inexplicably missing in the program released for the other. In other words, sometimes a program's limitations related less to differences in the hardware's capabilities than to

the incomplete design of the software. This brings up an important issue: how long a product has been on the market. The longer it's been out, the more comments and criticisms have come back to the man-

he design principles behind the two machines are radically different. The IBM is expandable by design. With its built-in expansion slots, the possibilities for configuring it are almost limitless.

lmost anything you add to the Macintosh, however, is literally an extra attachment. The Mac is a closed "black box." And even opening the Mac's outer casing voids Apple's warranty on the equipment.

> ufacturer, and the more it's likely that later versions have eliminated annoyances and incorporated improvements.

Product maturity, therefore, applies not only to the machines themselves but to the software, too. So, as we uncover our findings, bear the age difference in mind.

The Testing Methods As you will notice in the tests that fol-

Mac

low, we strove to compare like features similarly implemented and to avoid comparing widely different aspects of the programs. For instance, we do not discuss installation procedures.

In all cases, the standard tests simply timed the execution of three common operations: loading a program, saving a file, and opening a saved file. We also noted the number of keystrokes required for a particular operation, and, in some cases, the actual time it took to enter the keystrokes. The time it took to execute the stated task is given to the tenth of a second. In addition, we selected two or more characteristic operations for each applica-

tion and presented the comparative results for each. For example, we timed a searchand-replace operation using word processors and a recalculation using spreadsheets.

When counting keystrokes, we simply counted a "mousestroke," or doubleclick, as a keystroke command. A mouse-

stroke typically takes more time and movement than a keystroke, and there is inevitably a variation in operator speed. Because of this variation and because the time it took to enter a keystroke often made no significant difference, we finally chose to present only the execution times in the charts, which we averaged over three trials.

We used a color monitor and graphics card with the PC to display graphics but made no attempt to compare the full range of output devices available for the two machines. For example, we did not take into account the many options already available for PC output to

color printers and plotters, 35-

mm film cameras, and video output. Similarly, we did not compare the PC's "best possible" output to a laser printer against the Mac's refined type styles-available through Apple's LaserWriter printer, which incorporates typesetting fonts such as Times Roman and

Helvetica. Those who have had no prior experience with computers-or those whose opinions are based on media coverageoften see the Mac as friendly and the PC as intimidating. Indeed, there are many significant differences between the two machines that fall outside the realm of benchmark testing. With this in mind, we dispersed subjective evaluations throughout our discussion.

We began by comparing the nuts and bolts of each machine. In what follows we discuss the hardware components feature by feature and sum up the results in a chart. What then is the difference between a 512K PC and 512K Macintosh?

PC

The Technical Specs

To compare the PC and the Mac as closely as possible, we used 512K machines in each case, then added a mouse, a graphics card, and a color monitor to the

PC to run the graphics programs. We also attached a modem to each machine, which required us to add an AST board to to the PC (see chart). The remaining differences in hardware result from the different guiding principles behind their initial designs and the different prevailing state of technology at that time.

The Physical Design

In one area especially, the design principles behind the two machines are radically different—something that quickly becomes apparent when a user needs to expand his system beyond the manufacturer's basic configuration. The IBM is expandable by design. With its

built-in expansion slots, the possibilities for configuring the machine are practically limitless. Almost anything you add to the Macintosh, however, is literally an extra attachment. Even opening the Mac's outer casing voids Apple's warranty on the equipment.

Is the Macinton's closed "black box", what tuers want? We've passed the stage in the industry where most users loved timeling with the inside of a machine. After all, how many of us would really tackle installing an internal hard disk? On the other hand, who can spure the time lost when the machine is at the shop getting an expansion? Why can't we just pick up the needed unit and plug it in like a stereo component?

Chip Technology

While open architecture remains a subject for debate, the superiority of the Mac's underlying chip technology cannot be denied. Inside the IBM PC throbs an Intel

8088, while a Motorola 68000 races inside the Macintosh. Apple touts the 68000 as a 32-bit processor, but it's actually an advanced 16-bit processor for most operations. Likewise, IBM called the 8008 a 16bit processor from the start, while Intel's technical literature describes it as an 8-bit processor. (It has a 16-bit register but uses an 8-bit bus.)

Newer and more advanced, the Motorola chip has a larger instruction set that

processes more work with less code. Much of its power supports the Mac's considerable graphics overhead.

The Intel 8088 chip, however, has been around longer, and a great deal more is known about how to make it perform to its fullest capacity. For this reason, it will be around for some time to come—supported by the large and still increasing number of 8088-based systems in use.

The PC AT's 80286 would have made a better comparison against the 68000, but the AT isn't exactly the desktop norm.

Memory

Most IBM PCs in regular business use now have a minimum of 256K, and 512K is common. Some damage was done to the Mac's reputation as a business machine by its introduction as a featherweight 128K RAM machine. Now that the Mac has a higher memory capacity, the question is how soon will even more memory be ag-

fordably available for both machines. Numerous companies are interested in seeing the PC function comfortably with a megabyte or more of RAM, but there is considerable interest in giving the Mac a megamemory, too.

The question of ROM, or internal builtin memory, is slightly different. While the PC's internal 40K ROM provides a sophisticated structure for addressing the machine's various components, the Macin-

> tosh's slightly larger 64K ROM helps it support the extensive memory overhead that the easy-to-use graphics interface demands. In fact, developers trying to produce a Macintoshlike interface for the PC find the job more complicated because of the PC's CPU and ROM deficiencies.

Disk Drives

Like its chip technology, the Mac's more advanced disk drives reap direct benefits from technological advances made since the PC was originally designed. The Mac's 3½-inch Sony drives read their tiny, data-packed disks at variable speeds. One single-sided ½½inch floory stores more data

han a double-sided 5V-in-th floppy and fifti into a shit pocket. The 3Vi-in-th floppy is encased in a rigid, normenovable plastic sleeve with a sliding metal shield over the accessible part of the disk's magnetic surface. These disks are far more ranged than free. These disks are far more ranged than ence has convinced us that approximately 1 out of 20 new 5V-in-th floppies are not usable because of BDOS errors in the formating step. In addition, we have formatted almost 100 of the MacInton's floppies from the control of the size of the control of the first time and is still usable.

The Mouse and the Keyboard

The Macintosh comes with a mouse, of course, and for all of our tests we used Microsoft's mouse on the PC with those programs that were capable of supporting a mouse. Generally, cursor movement by mouse tends to be rather jumpy on the PC screen; whereas it is smooth on the Mac. However, the difference didn't bother us very often since most of the programs we tested on the PC could not be used with a mouse, anyway.

While the Mac's stripped-down keyboard is important for the machine's transportability, the mouse alone does not match all of the advantages of the PC's function keys and a numeric keypad (although you can attach one separately to the Mac). Moreover, the Mac's screen is rather slow to display characters as they are typed in through the keyboard. Speed typists will prefer the PC keyboard, which of-

fers a far more satisfying tactile response and displays typed characters far more quickly on the screen.

The Screen

There is virtually no comparison in screen resolution between a standard PC and a Macintosh. Viewing the Macintosh's 512 × 342 pixel resolution next to the PC's 80-column by 25-line screen makes the PC's screen look crude in either the text or the graphics mode. We used a standard IBM graphics adapter and an IBM color monitor for normal graphics on



Processor: Intel 8088 (16 bit)

Clock speed:

4.77 MHz

DAM. 512 KB (256K on AST board)

ROM: 40 KB

Video display:

II" color, 640 x 200 pixels

Disk storage: 51/4" diskette. double-sided/360K

Serial ports: One with AST board (add-on)

Fan: Yes

System unit (HxWxD): 16 5" x 20" x 16"



MAC

Processor: Motorola 68000 (32 bit)

Clock speed: 7.83 MHz

RAM: 512 KB (built in)

ROM:

64 KB Video display:

9" black & white, 512 × 342 pixels Disk storage:

Fan: No

16 lb. 8 oz.

2.6" × 13.2" × 5.8" (58 keys)

the PC, though we could have gotten higher resolution with IBM's Enhanced Graphics Adapter and Monitor, however, the EGA has a long, long way to go before it becomes the hardware and software standard for the PC

The other obvious difference between the two machines is their screen size. Although the Mac's 9-inch screen can seem rather cramped at times, the size is less troublesome than it might be on a lowerresolution screen. You can choose to view more of a file on one screen by selecting a smaller type size for text or spreadsheet en- day's market.

tries, and with MacDraw you can scale the image down to fit a full 81/2- by 11-inch printout, or you can create a larger image on the small screen.

Running Software

Although facts and figures are one thing, performance is quite another. That's the reason why we will next take a look at both the measurable and subjective differences between the PC and the Macintosh as they run some of the most commonly used business software available on to-





WORD PROCESSING



IN EVERY TIMED TEST THE RESULTS WERE RATHER CLOSE.

ince word processing is probably the most common application for personal computers, a slow or awkward program affects overall productivity. Because word processing, for most people, is part of their daily work, we chose it to begin our comparison.

Product Selection

We were able to test word processing with the same product on both machines: Microsoft Word. The PC version of Word was first released in November 1983; in these tests we used the latest version, 2.0 which, along with the Microsoft mouse, was released in January 1985. The first Macintosh version of Word, released that same month, was the one we used for our tests here.

What We Did

Requires: 256K

To test word processing abilities, we built the same threepage, 11,538-character (11K) document on each machine. Be-

PC Product Microsoft Word 2.0 Microsoft Corp 10700 Northup Way Bellevue, WA 98004 (206) 828-8080 List Price: \$375

Bellevue, WA 98004 (206) 828-8080 List Price: \$195 Requires: 128K CIRCLE 646 ON READER SERVICE CARE CIRCLE 647 ON READER SERVICE CARD

Macintosh Product

10700 Northun Way

Microsoft Word 1.0

Microsoft Corp.

d on the PC: The screen only displays generic fonts

sides the standard tests (load program, save data, open saved file), we measured the time and keystrokes required to search and replace a string of text and to change the margins for the whole document.

Data Entry

The data entry process was fairly straightforward on both of the machines: Once the program was loaded, we simply began typing. Both machines offer some common formatting commands (bold and italics, for instance) as menu selections. The PC version, however, also lets you override the menu and key in the command. Truly useful programs should offer both of these options: a helpful menu for beginners, with keyed command alternatives for more experienced typists who may not want to use the

mouse.

The fact that these common formatting commands are available only through a menu on the Macintosh is a limitation of the word processor's program code rather than a fault of the hardware. (MacWrite, for example, includes keyboard command alternatives to the menu for bold and italics.) Perhaps later versions of Ward for the Mac will incorporate some of these missing conveniences.

Other Features

Although Microsoft Word, as designed for the PC, allows you to select different type sizes and styles, what you see on the screen is not necessarily what you get in print. For example, ital-

& File Edit Seerch, Character Peregreph & A Status Report

on Ergonometric Progress

er three years ago, at the March 15, 1982 meeting of the board of directors of Morrison, Morrison, and Woolsey, Inc., a speci emission was set up to study the ergonomics of our central office in Atlanta. The purpose of this study was to determine how Morrison, Morrison, and Woolsey, Inc could improve the physical pronment, thereby increasing the comfort and efficiency of all goes in all departments

The study was conducted in three phases

March 1982-March 1983 Analyze existing workspa-April 1983-April 198 May 1985-April 1986 Solicit proposals for red Implement redesign (OI)

Word on the Macintosh: The display shows custom fonts.

On the other hand, while the Macintosh version of Word does have full print-merge capabilities—an absolute necessity in our view—it does not contain a spelling checker. Some potential Mac users would miss the excellent Spell program in the PC version. Though both versions offer a wide variety of output device drivers, the list for the PC is much longer.

the few PC programs that can do it.

It's possible to send a text file from the PC to the Mac and vice versa, but the transfer is not as direct as you might expect. On the Macintosh, you must first save the file as "text only"—that is, none of the character formats available through Word are per-

Because of its built-in Clipboard cut-and-paste facility and bit-mapped screen, text documents on the Macintosh can include charts and pictures pasted in from charting and drawing programs.

his capability is still not widely available on the PC.
On the other hand, although both versions offer a wide variety of output device drivers, the list for the PC is much longer.

served, and the file is sent as a simple ASCII file. To obtain an ASCII file with the PC version, you must print the file to disk with the printer type "PLAIN" selected.

Conclusion

We were surprised to find that in every timed test the two mahines were rather close, with the Macintosh coming in slightly faster on most tests. Furthermore, since Word for the PC is moused, most common operations were equally easy to perform on either machine. Finding the two machines comparable, we would stay with whichever one we started out on—neither system offered anything worth switching for.



BENCHMARK TESTS



In all the word processing tests, the longest operation was loading with Word program sele. It also always the biggest difference in time between the two much mass 3.55 of seconds on the NC wereas 2.00 of the NC were 2.00 of the NC

When I came to performing the margin resetting task, the Macheton came or dated on the countries, of the PC this last took at keystroles (12 seconds laying tiese) juin 4.2 seconds seconds us keystroles (27 seconds laying tiese) juin 4.2 seconds seconds (12 seconds laying tiese) juin 4.2 seconds seconds (12 seconds laying tiese) juin 4.2 seconds seconds (12 seconds laying tiese). Les extra seconds (12 seconds laying tiese) juin 4.2 second seconds (12 second laying tiese). Les extra seconds laying tiese) is the PC (12 seconds laying tiese). Les the PC (12 seconds laying tiese) laying tiese la laying tiese laying tiese



SPREADSHEE



THE PC MAY BE IN FOR SOME STIFF COMPETITION.

long with word processing, spreadsheets are one of the most commonly used applications on any personal computer. Because these applications are used so frequently, speed can become more important than menu convenience in performing basic operations. Screen resolution and color capabilities are less important to spreadsheets (at least in this comparison, where we have put business graphics under a separate heading). And although the ability to see negative numbers displayed in red is sometimes handy, we rarely print spreadsheets in color.

Product Selection

It was natural to select Lotus's 1-2-3 for the PC application, since it is the most commonly used spreadsheet on the market. Our choice of spreadsheet for the Macintosh, however, deserves some explanation. During the first year the Mac was on the market, the only spreadsheet available for it was Microsoft's Multi-

PC Product 1.2.3 Deleges 1A

Lotus Development Corp. 245 First Street Cambridge, MA 02142 (617) 577-8500 List Price: \$495 Requires: 192K CIDCLE ME ON DEADED SERVICE CARD

Macintosh Product

Crunch (prerelease) Visicorp-Paladin Software

2895 Zanker Road San Jose, CA 95134 (408) 946-9000 List Price: \$295 Requires: 512K CIRCLE A44 ON BEADER SERVICE CARD plan. When we began conducting these tests, a number of other spreadsheets were about to be released, including Lotus's version of 1-2-3 for the Mac, Jazz, and Microsoft's Excel for the Mac. To compete with the heavyweight 1-2-3, we wanted as powerful a package as possible. We looked for one with a large number of built-in functions as well as speed. Visicorp-Paladin's Crunch seemed to fill the bill, with its 74 built-in mathematical functions and its 250-column by 9,999-row worksheet.

Like 1-2-3, Crunch includes both graphing and database management functions, which we did not test for this review. Although the prerelease version we used still contained some frustrating bugs, it was able to complete the necessary tests.

What We Did

In addition to the standard tests (load program, save data, load saved data), we measured recalculation speed for two spreadsheets on each machine. Each spreadsheet consisted of a 25-row by 25-column matrix of entries: One included only addition formulas; the other, only multiplication. In both cases, the result in each cell depended on the value calculated for the immediately preceding cell.

Data Entry

We found the Mac's mouse very handy for selecting cells and making spreadsheet entries, although on the PC similar cell selection could be accomplished by using the four arrow keys. Crunch made full use of the Mac's iconographic menu capabili-4 file felt format fant Directory Graph Database Soc



s's 1-2-3 for the PC uses fast keyboard commands.

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			Mul Mul	1 les1			
	A .	D		D	2	1	6
$\overline{}$		1.11	123	1 37	152	1.69	16
2	110	1.23	1 37	152	169	1.87	2.0
3	1.27	1 37	152	1 09	1 07	2.08	21
4	1 37	132	169	187	2.06	2 30	25
3	1.52	169	187	2.08	2 30	2.36	26
6	169	1.67	2.00	2.10	2.56	2.84	1
7	1 87	2.08	2 30	256	2.84	315	33
	2.08	2 30	2.54	2.84	315	3.50	7.6
4	2 70	256	284	315	3.50	100	43
10	2.56	284	315	350	3.00	4.31	43
11	2.84	213	350	3.66	431	1.70	11
12	215	350	3.86	4 31	4.78	5.31	54
15	350	3.86	4 31	1.76	5.31	5.90	6.5
14	1 88	4 31	4.78	5.74	5 90.	6.54	7.2
13 1	4 31	4.78	5 31	5 90	654	7.26	80
16	1.70	5.31	5.90	6.24	7.26	8.06	8.5

The Mac's Crunch performs graphics well with co

Other Features

Although we compared charting abilities using a standation or graphics package under a different beading in this article, it's strictle, worth mentioning here that it is much simpler to create a graph with data from Crusch than from 1-2-3. With Crusch, you simply select the cells to be graphed and click the mouse on one of the chart icons shown in a memu bar across the top of the screen. With 1-2-3, selecting the cells to be graphed is more cumbersome, and you need to change disks in order to view the graph.

You can transfer spreadsheet data between the two machines and load it from almost any originating spreadsheet peakage into almost any target package. It's conceivable, therefore, that a large office could use different machines and still merge spreadsheet data when necessary, but the conversion is cumbersome. In all cases the spreadsheet data must first be converted to DIF, SYLK, or ASCII formats before it is transmitted, then converted back to streadsheet format at the other end.

Our early results indicate that the PC may be in for some stiff competition in the spreadsheet arena, especially if spreadsheets on the Mac eliminate the extensive training needed to learn 1-2-3 on the PC.

the Macintosh's mouse is very handy for selecting cells and making spreadsheet entries, although on the PC similar cell selection could be accomplished by using the machine's four arrow keys.

Conclusion

Spreadsheets on the Macintosh can be more powerful and easier to use than on the PC. Our preliminary results indicate that the PC may be in for some stiff competition in the spreadsheet areas, especially if spreadsheets on the Mac are able to eliminate the one- or two-day training period required for the novice user to learn 1-2-3 on the PC.



BENCHMARK TESTS



Lottus? 1-2.3 loaded into the PC 3 times faster than Cruzolo coded into the Macintonia: 14 seconds on the PC-versus 45 seconds on the Mac. Seving the data required only one mouse click on the Mac (C.4 seconds) plus 19 seconds of seazution time. On the PC it took four keystrokes or 2 seconds to enter the Save command, but the save operation was completed within 1-4.5 seconds, giving the PC a net lead over the Macintosh. The last of our standard testaceding the seved file—required 12-5 seconds on the PC and 23.5

On both machines, the Recalculation command required only a single keystroic, though the PC's keystroic took less time to perform than the Mac's mouse click equivalent (0.13 exconds versu 0.55 exconds). Once the command was entered, assecution time to recalculation were nearly identical on both machines for addition and multiplication; roughly 5 exconds in all cases.





THE MAC CAN HOLD ITS OWN IN DATABASE MANAGEMENT.

PC Product

or both mainframes and minicomputers, the database management application is the most essential-far more so than word processing or spreadsheet number crunching. With personal computers, it seems to work the other way around.

Many of us can do everything we need to do with a word processing package and a spreadsheet, however it takes a certain degree of maturity-or specific business need-to decide to build databases. They are, after all, the most difficult common business application for users to learn. Computer system consultants

Macintosh Product

Powerhose 2.1 Powerbase Systems, I 12 West 37th Street New York, NY 10018 (212) 947-3590 List Price: \$595 Requires: 256K

Rivth Software Inc. 2655 Campus Drive, Suite 150 San Mateo, CA 94403 (415) 571-0222 List Price: \$495 Requires: 512K CIRCLE 642 ON READER SERVICE CAP are often called in to design the database, generally with the intention of making the program easier for the office staff to use. We were especially curious, then, to see how the Mac's acclaimed "friendliness" carried over into this highly complex application.

Product Selection

We selected Powerbase for the PC because it is graphically oriented, powerful, and easy to use. For the Macintosh, we chose Omnis3, a powerful hierarchical database-and one of the first full database systems available for the Mac.

What We Did

We built a relatively simple database on each of the machines: an invoice file for a dentist's office. The database was designed to pull in data from both the client file and from a file that listed all of the dentist's available services and their charges. We entered 30 client records in each system, 10 services, and a dozen invoices. These data files required 15,504 bytes on the PC, 15,360 on the Mac. In addition to the standard tests, we measured the





Omnis3 takes advantage of the Mac's dialog box, which allows a simple click of the mouse to designate choices

time required to find a record and the time required to save a new record.

Data Entry and Manipulation

Both these packages entits an elaborate system of means and rompts to help you design your database. It was easy to set up the invoice file so that it automatically pulled data from the client and services files as you billed a client. Once the database itself was designed and in place, screen entry was easy and straightforward on both systems. Some keying conventions took as while to get used to; for example Powerbase uses the F9 and F10 keys instead of the arrow keys to move accord on the menu bar, and On-nidd forces you to press the Tab keys to move accord on the menu bar, and On-nidd forces you to press the Tab keys to move a finished during early, since the Return key signifies that you are finished during early, since the Return key signifies that you are finished used the memory of the property of the hardware.

We compared the times required to search the database for a particular record. The Mac was faster in both the keying time and the search time, though the two machines can be judged comparable: The Mac took 1.5 seconds to locate the record: the PC took

Although Omnis3 proves the Mac can handle comprehensive business systems, few DMBS products are now available for the Mac. We need to wait for a popular consensus to put new products through more-rigorous tests.

At takes a certain degree of business maturity to decide to build databases. They are the most difficult business application to learn, so we were curious to see how the Mac's friendliness carried over to this application.

2.4 seconds. The test of saving a record proved to be an even match: each machine clocked in with a keying time that was under I second, and an execution time of approximately 4 seconds.

Conclusion

Considerable of the control of the c



BENCHMARK TESTS

Operation	Number of keys	Time	in se	conds 2	3	4	5	
Load the program	PC 3 MAC 2	F			=	=	42.19 31.67	Ī
Open application	PC 3	F						
Find a record	PC R	F		7				****
Save a record	MAC III							****

The MacIntoith look less time to load Crimist Dans the PC book to all of Powerbase Fine mouse clicias reginging 0.24 seconds, plast 31 seconds for the communit of a security. On the Pc, the three hypothesis both 1 second, followed by 42 seconds to load the hypothesis both 1 second, followed by 42 seconds to load considerations, so we couldn't time serving a file as we call for other applications, one couldn't time serving a file as we call for other applications, for one distablisses structure is both. However, it can be opened directly, Opening required only three keystrokes in each case, and the association times were very cloce. So seconds on the Mac. 5.89



BUSINESS GRAPHICS



MAC WINS ON EASE OF USE-IF YOU DON'T NEED COLOR.

f you're like most, you need charts only occasionally for making a presentation, assembling a financial report, or preparing for sales meetings—so you don't want to spend a week trying to learn how to build a chart. Our examination of business graphics, therefore, includes subjective evaluations that may ourweigh the benchmark results.

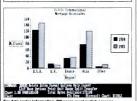
Product Selection

We were able to use the same program on both machines: Mirosoft's Chart. Microsoft has been making a considerable effort to adapt the PC version of Chart to the hardware environment in which it is used. In other words, in low-resolution mode, the program will build the most presentable charts possible, but when you add a high-resolution screen and six-pen plotter; it looks even better: Chart automatically adds more type styles and greaters smoothing effects, as befits high-resolution graphics ers smoothing effects, as befits high-resolution graphics.

PC Product Microsoft Chart I.0 Microsoft Corp. 10710 Northup Way Bellevue, WA, 98004 (205) 828-8080 List Price: \$250 Reguires: 128K (256K recommendedly graphics monitor. GPIGLE 841 ON FREADER SERVICE CARD

Macintosh Product Microsoft Chart I.0 Microsoft Corp. 10700 Northup Way Bellevue, WA 98004 (206) 828-8080 List Price: \$125 Rounters: 128K

List Price: \$125 Requires: 128K. CIPCLE 640 ON READER SERVICE CARD



This test brought us head-on to one of the biggest limitations of the Macintosk a screen that's black and white only, with (so far) no color output device capabilities. The Mac's high-resolition screen allows for the full range of Chart's type styles and shading options, but only the PC version can output in color. The Mac's high-resolution screen is a high plus, and we personally preferred it to the PC's crude resolution in color. In fact, on a standard PC. Chart is best run in the monochromatic mode.

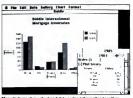
Many camera devices for producing sides or video presentaions directly are available for the PC but not for the Mac. This aside, and bearing in mind that color can be one of the most important elements in business graphics, we confined our examination to the chart-building process and the way it looked on the screen, rather than comparing the printed output capabilities of the two machines.

What We Did

Using Chart on each machine, we built a bar chart that incorportated two data series: 1984 versus 1985 sales in five regional sales areas. Besides the standard disk I/O tests, we measured the time and keystrokes required to change a bar pattern, switch from a bar chart to a column chart, and redraw the chart after changing one or more data orticies.

Data Entry

One nice feature of Chart on the Mac is that you can see both the data series and the chart at the same time. Although it is re-



mac windows show chart and data series information togeth

downole Robert France

Another major difference between the two implementations is that the PC version does not use a mouse. Instead, for all operations including menu selection, it uses the arrow keys to move the cursor. Our keystroke time trials showed that the Mai's double-click mousestrokes took longer than the PC's commands in several cases, but subjectively we felf that using the mouse made it is simpler to, say, select part of a chart, move the legend, or change the typeface of a label.

Other Features

We did not test another of the Mac's unique features against the PC its ability to cut and pasts between applications easily through its built-in Clipbourd facility. On the Mac, copying data from Malingham of Chart, or copying a graph from Chart to Word, requires only you or there mouseastocks as each end of the Word, requires only you or there mouseastocks as each end of the Malingham data to Charr but cannot copy a chart into a test file, the Mac makes integrated report production a simpler task. This compensates somewhat for its limitations in producing color pre-

sentations.

Charts saved in SYLK format on either machine can be telecommunicated to any other machine's Charr program, so the PC
and Mac should be able to exchange data quite easily by using
Charr. However, we did not test this feature either.

with Chart on the Mac, you can see both the data series and the chart at the same time.

A TV Lany camera devices for creating slides or video shows are available for the PC.

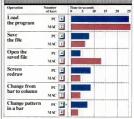
Conclusion

Our purpose here was to compare two versions of a standatore business graphics package rather than the charting functions of a spreadsheet program. To do so, we consciously sacrificed the convenient direct connection with preadsheet data in favor of better-looking, presentation-quality graphics. Of course, both versions of Chart let you link a data series to a Multiplian file, but one feature we missed on both machines was the ability to enter formulas directly as part of a data series for a rehard.

If we had to choose between the two machines on ease of operation alone, we would certainly choose the Macintosh for chart building. However, if we wanted color presentations, we would stick with the PC.



BENCHMARK TESTS



As with the other applications, the longest single operation is loading the proprient from disk. The loading time rehereneives were close, ranging between 2.78 cm of 25.55 seconds on the PC and between 2.78 cm of 25.55 seconds on the Mac. In number of anywhere are despring time, however, the Macintosh came out of saystrokes and laying time, however, the Macintosh came out of saystrokes and laying time, with the buyer does that took an event of the despring time of the says of the property of the says of t

half that time (1.4 seconds), followed by 6.15 seconds for execution When it came to opening a sawed chart file, however, the PC was phenomenally faster. But its speed reflects the fact that on the PC, the opening acreen displays the data series lists only, whereas the Mac's opening acreen includes a drawing of the chart, too. The

s of execution time; the Mec's sin

simpler the chart, the feater the Mac's chart file will load. To convert the chart from a hortzontal bar to a vertical column required only three quick keystrokes (1.98 seconds) on the PC, as opposed to the Mac's two mouse clicks with a forced with between them, which required 3.8 seconds. After new data was entered, the Mac required only 4.07 seconds to redrive the chart on the screen. This contrasts sharply with the PC's 8.48 seconds.

where the PCE is To Strayed as in places in a now was on the same than the PCE in To Strayed when—dispending on which pattern you when the PCE is To Strayed when —dispending on which pattern you will not be some or the post of the



DRAWING PROGRAMS

THE MAC'S MOUSE AND MENUS MAKE DRAWING A BREEZE

f all the applications that we tested in this project, the drawing programs demonstrate some of the Macintosh's most outstanding featuresand some of the PC's greatest weaknesses. From the beginning, Mac users have enjoyed the ability to create drawings with the MacPaint software that Apple bundles with the Mac. Most PC users, on the other hand, have had little experience with free-form drawing packages. Those that have been around for a while either require the purchase of additional hardware, such as a digitizing tablet, or are command-driven and relatively clunky compared to MacPaint's point-click-drag mouse operations.

Some of the newer drawing programs that are being marketed for the PC, which attempt to emulate MacPaint and MacDraw. have iconographic menus and a mouse, but none has matched the flexibility in design and type styles that are made available by the Macintosh's high-resolution screen.

PC Product DR Draw 1.0 Digital Research Inc. P.O. Box 579 Pacific Grove, CA 93950 (408) 649, 3896 List Price: \$295 ulires: 128K; graphics card

Macintosh Product MacDraw 1.7

Apple Computer, Inc. 20525 Mariani Ave. List Price: \$195 sires: 128K CIRCLE AND ON READER SERVICE CARD

Cupertino, CA 95014 (408) 996-1010



PC draws in color, but the resolution is medium.

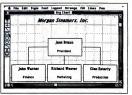
Product Selection For this comparison, we chose MacDraw rather than Mac-Paint, since MacDraw is an object-oriented drawing program that lets you rearrange text and graphics on the screen easily. For the PC, we selected DR Draw by Digital Research because its features and operation are more similar to MacDraw's than are those of any other PC package available. DR Draw, which has been out since January 1984, still carries the original release number, 1.0. MacDraw was not released until March 1985, but its predecessor, LisaDraw, had been around for several years. Earlier beta versions of MacDraw have been around for so long that the first official release is, in fact, Version 1.7.

What We Did

We used each program to draw a simple four-person organization chart. In addition to conducting the standard tests, we measured the amount of time and number of keystrokes required to change the orientation for the printed image from "tall" to "wide," turn the grid or ruler on, move a box on the screen, and change the size of the type in a heading.

Data Entry

The drawing process itself was much faster and simpler with the Mac. Menu selection functions that required one step on the Mac required one or more additional submenu selections on the PC. On the Mac, we could move an object on the screen by simply clicking and dragging the mouse, whereas DR Draw required



Mac draws with high resolution, but in black and white.

us to mark the target coordinates and then wait for the program to move the object.

Thus the Mae's greater case in drawing translates into greater artistic freedom and power for the user. For instance, the Mae prints the entire drawing, no matter how many pages it requires. No Parup mrints only those parts of the image that fall within the page outline. When you select tail or wide print orientation, the corresponding outline is deeped in over the screen image, the print. Moreover, it's much easier to rearrange or resize the full drawing on the Mac than on the PC.

Other Features

Other Yestatres

Although the Mac has a wider range of fill patterns to choose from, the PC—with DR Drow—allows at least a limited color from, the PC—with DR Drow—let us select among only three different colors (plas black). Since lose is important from only present prophics, and what shades was been supported from the presentation of the properties of

The Mac lets you copy drawings into text files and print out whole documents that include the graphics in stream with text.

Some page layout applications for the Mac even let you compose multicolumn page layouts with graphics. No drawing packages for the PC are as fully integrated with text as are those available for the Mac. Currently, the Mac and the PC have no drawing programs in common, and there is no way to transfer graphics images between the two machines.

Conclusion

Of all the different types of programs tested in this comparison, the drawing programs gave the to the widest differences in subjective experience. There was no question that creating an organization chart was faster and simpler with the Macintosh, and the final printout was generally more attractive. This last judge-ment may be debated if we compared the Mar's black-and-white output to DR Draw's printout on a colar polarie, that, as we more differences between color and black and white.

issued to the control of the control

BENCHMARK TESTS

Operation	Number of keys	Time in seconds 0 2 4	6	8	,
Load the program	PC B		- 5	46.65	П
tne program	MAC 2		_3	46.03	ı
Save the file	PC 2		- 5	21,89	
the file	MAC I				
Open the	PC 12		_ <	51.74	ī
saved file	MAC 3				
Change from "tall" to "wide"	PC 3				_
	MAC 3				
Turn rulers (grid) "ON"	PC 3				-
	MAC I				
Move a box	PC 8				"
	MAC 3			Į	
Increase	PC 9				П
font size	MAC 2				

Although it took a few more keystrokes to load DR Draw on the PC then to bring up MacDraw on the Mac, the two programs requires about the same amount of time to execute the Load command: an average of 46 seconds. This relatively long loading time is because both programs creats rather elaborate screen images in the process

The Mic was more then 4 times faster in saving the file—5 seconds versus the PC's 22 second—and could open the saved file nearly 10 times faster than the PC'—5 seconds versus the PC's 10 seconds versus the PC's 10 seconds versus the PC's to not the PC, but the actual keying time turned out to be faster than the Mic's three mouse clicks. The acreen-building speed that these tests reflect demonstrates the advantage of the Mic's built-in screen processing over DR Town's need to include si to of the screen

processing in the program code.
The Bace bold much longer to perform a change of page orientation from tall to wide: 4 seconds keying time plus 3 seconds or execution time versus the PC's 3 seconds keying time plus 1 second secution time versus the PC's 3 seconds keying time plus 1 second secution. The difference can be accounted for by the fact that the Mac redrives the entire acreen after this command, whereas DR Draws simply drops an outline of the page boundaries over the

drawing without inchrawing the screen. The Nake wonth has lest for turning the grid or ruler on: one mouse The Nake wonth has lest for turning the grid or ruler on: one mouse the property of the property



PROGRAMMING



MAC'S MENUS CAN IMPEDE EXPERIENCED PROGRAMMERS

hen we ran seven short programs coded in Microsoft BASIC on each machine to measure internal processing time, we were able to throw out the stopwatch and let the programs count the seconds themselves. Not surprisingly, the Mac's 32-bit processor handled every operation (except one, noted below) twice as fast as did the PC's 16-bit chip.

Product Selection PC Product

Microsoft BASIC 2.0

10700 Northun Way

Bellevue, WA 98004

537 ON DE ADER SERVICE CARD

Microsoft Corp.

(206) 828-8080

List Price: \$395

Microsoft Corporation has written the BASIC version that you will find on virtually every personal computer on the market.

Microsoft Corp. 10700 Northun Way Bellevue, WA 98004 (206) 828-8080

Macintosh Product Microsoft BASIC 2.1

List Price: \$150 res: 128K CIRCLE GOS ON READER SERVICE CARD We used the latest versions available: Version 2.0 for the PC, and a prerelease (beta copy) of Version 2.1 for the Macintosh that specifically improved processing speed over the previous version. BASIC on the Mac includes some special graphics and sound commands that are not available on the PC, but the commands used in these tests work the same way on both machines.

What We Did

In the standard tests, we measured the time needed to load BASIC and to save an already coded program. However, we did not record the time it took to open a coded program because all our programs were so short that it took only milliseconds. In addition, our programs tracked their own times for executing multiple loops to test integer addition, floating-point calculations, string concatenation, internal data table lookup, an empty loop, and data file create/read/update.

Data Entry

We found it handy that the PC incorporates the most commonly used BASIC commands-LIST, RUN, LOAD, SAVE, and so forth-in one-stroke function keys. The Mac's pull-down





Other Features

One advantage of the Mac's BASIC against the PC's is that you can view several windows at once. For instance, you can view the code in one window and watch the results of the program as it is running in another window. If the Mac discovers an error in your code, it displays the full line of code framed in a black box along with the lines immediately preceding and following the error. You can edit the line directly.

In contrast, the current PC version tells you what line number has an error, but leaves the next step to you; you have to enter a command to display and edit that line. The good news is that a

f the Mac discovers an error in your code, it will display the full line of code framed in a black box along with the lines immediately preceding and following the error. You can edit the line

directly. he most current version of PC BASIC tells you what line number has an error, but you have to enter a command to display and edit

that line. A windowed version of PC BASIC is on its way later this year.

windowed version of BASIC for the PC is on its way, probably in conjunction with Microsoft's expected release of Windows later this year.

Conclusion

BASIC is not the type of application that would sway our choice between two machines. Obviously, we would use whatever version of BASIC was available for the machine that we selected on the basis of other considerations. It's clear, however, that BASIC for the Mac is a more evolved product, and the PC version has some catching up to do.

BENCHMARK TESTS

	0112750	1-1-11-11-12-12-12-12-12-12-12-12-12-12-
Operation		Time in seconds 0 1 2 3 4
Load	PC	
the program	MAC	24.06
Save the file	PC	
the the	MAC	
Record	PC	
management	MAC	1
Integer	PC	
addition	MAC	
Second	PC	
integer addition	MAC	
Floating point operations	PC	
	MAC	
String	PC	
concatenation	MAC	
Internal data	PC	
table lookup	MAC	
Empty loop	PC	
	MAC	

The PC was 8 times faster than the Mac in loading the BASIC artly because the Mac version builds a en in addition to loading BASIC into memory, wherein is already in ROM. It simply loads the rest

ine; oddly, some of the Mac's ti



TELECOMMUNICATIONS

WITH THE NEW TECHNOLOGY, WE NEED A NEW MINDSET.

s the number of dial-up networks, Information services, and mainfraness using PCs as transto terminals increases, more offices will invest in a modern and telecommunications package for their microcomputers. Besidest utility to mainfranes, PGs and Macistoshes can talk to each other more easily over the phone inse than when they're in the same room. Telecommunications can be confusing to the unifialted, who sumthe over terms like much as path it, protocol, and X to Ocify Tecom release of the contraction of the confusion of the c

Product Selection

Hayes has produced versions of its Smartcom II telecommunications package for both the PC and the Macintosh. The developers at Hayes admit that the Macintosh version benefited by some

PC Product Smartcom II 2.1 Hayes Microcomputer

ToS Westech Drive
Nocross, GA 30092
(404) 662-7100
List Price: \$149
Requires: 192K

Macintosh Product Smartcom II 2.1 Haves Microcomputer

705 Westech Drive Norcross, GA 30092 (404) 662-7100 List Price: \$149 Requires: 128K

gives the Mac two standard RS-232 ports and a parallel port.

monly used services.

What We Did
We built an autodial procedure using Smartcom II on each
machine to dial up one of the major information networks (CompuServe Information System). We timed only two procedures;
loading the telecommunications program and dialing up CIS with

of the lessons they learned in developing the PC version, and that

later versions for the PC will probably benefit by what they

learned from the Macintosh. Both versions include standard fea-

tures of telecommunications such as sending and receiving at

1200 baud, printing while on-line, saving to disk as the file is re-

ceived, auto-dial capabilities, and preset auto-dial files for com-

To accommodate the modern, the PC required a serial port,

which we added with SixPak Plus from AST Research. The

Mac, on its part, required a special cable to connect its compact

RS-232/422 port to the Smartmodem's standard RS-232 port: We used Microsoft's MacEnhancer—a piece of hardware that

We used the Haves Smartmodem 1200 with both machines.

an auto-dial sequence. Data Entry

We found no difference in the type of information required. You can enter phone numbers, log-on codes, and passwords into each program actively as part of the dial-up procedure or enter the information into an auto-dial-up listing that can be saved and in-



The PC's screen doesn't help you monitor the dialing out proces



The Mac keeps you on top of your call's status

One advantage of the Mac's iconographic menus is that we could see and make a selection more quickly than with the PC's text menu. There is no question that the brain can assimilate the meaning of a leptine more quickly than it can decipher the meaning of a phrase of text. Smartcom II on the Mac, more than any other package we tested, was so graphic that an aboultely illiterate operator could bring up the program and activate an auto-dial sounce.

Other Features

Once the connection to a service is made, there is no significant difference between the two machines. The Mac displays incoming data in a plain type style, and the keyboard commands accepted by information services are not presented in a menu. If you are dialting up one Macintosh from another, however, you can use Smartom II's pencil (so to call up a "carvas" on which

Only graphics images stored in a command language can be transmitted between PCs using the same graphics package.

on the Mac you can call up a "canvas" on which you can create pictures that the party at the other end can see and edit.

you can create MacDraw-like pictures that the party at the other end can see and edit in an interactive drawing session. You can also send MacPair timages and other graphics Mac-to-Mac. No such facility is available through the PC; only graphics images stored in a command language can be transmitted between PCs using the same graphics package.

Conclusion

We believe that telecommunications are becoming easier on the PC, but the Smarroum II* annualing apphies on the Mac make the few minutes it takes to connect go by quickly. Loons representing the stages of the process line up on the screen, and a telephone with moving eyes watches as each active sage is highest of seoparce. After this entertaining part, your immention lighted in sequence. After this entertaining part, you immended the property of the property

so, the process is going to be slow. For the time being, too many offices and information services are locked into equipment that is designed to handle words, not pictures, and the transition to graphics will require some changes in how we view information—a new mindset to go with the new technology.



BENCHMARK TESTS



The PC was a few seconds feater in loading the program: 25.9 seconds wrates 30.3. The PC slot checks the modern during the loading process, whereas the Mac version does not check the modern until the disling procedure is initiated. The Mac's additional seconds of loading time can therefore be explained by the fact that builds a set of detailed drawings as menu loons along the bottom of the screen. In contrast, the PC's opening screen is a standard text.

After building the same auto-diel and log-on sequence on each machine, we thread the process from the moment the auto-diel comand was invoked to the moment the information service's opening screen appeared fin this case, CompuServe's opening message). Again, the PC beat the Mac by 1.5 seconds (24.97 versus 26.55 agent).

The Final Wrapup

Looking beyond the hype of the Macintosh's futuristic dragonslayer image and IBM's "good old days" with Charlie Chaplin, what is each machine really do-

ing for you? What do you want in a viable office computer? Sooner or later, you must consider the overall ergonomic advantages of each machine.

One of the most talkedabout features of the Macintosh is its simple user interface, which makes it easy to learn and to use. The other, on the negative side, is its incredibly slow disk file I/O. As it turns out, both of these statements may be myths in that they are exaggerated representations of the truth. As some software manufacturers begin to make the PC seem more friendly, or Mac-like, so too are others finding out how to code applications that make the Mac seem

faster. What this statement means is that the two machines and their applications are on a course of convergent evolution, with some manufacturers scrambling to release business applications for the Macintosh, while others are designing pop-down and iconographic menus to make the PC's applications more inviting to first-time users. "Unfriendly" implementations might have lasted much longer on the PC without the market's increasing pressure for simplicity and ease as embodied in the Macintosh. On this score, the Macintosh has an edge over the PC in that its friendly screen designs are built from the inside out. Until a high-resolution screen with built-in processing is available for the PC, much of the "friendly" appearance of its newer programs is simply a face-lift-skin-deep beauty that isn't as easy to work with as

Skeptics have tended to dismiss any popular votes made on the basis of friendli-

ness. After all, they say, new users will eventually become experienced and may even become "power users." Others contend that PC users are hardier for having gone through the "boot camp" of learning DOS—and that Macintosh users get spoiled on simple software, making it harder for them to overcome psychological barriers to learning more-complex packages. Is the Mac a machine that its users will outgrow? Does its simplicity of opera-



Writers Diane Burns and S. Venit set the Msc and PC side by side in their San Francisco office and put them to the test.

tion mean that only simple functions are available? Will its ostensibly wonderful user interface eventually become a hindrance to productivity? These are difficult questions.

No one should underestimate the destructive effect that intimidation can have on learning. An application that's easy to learn not only takes less training time for your staff, but also makes it likely that once they learn the simpler options they'll explore the more advanced ones on their own. Moreover, the ease-of-use factor may have a more immediate impact at the management level than at the clerical: In large corporations, the support staff has been working with word processing computers for years, but executives who are still working with pens on paper qualify as truly first-time users. Experienced users at all levels would be able to delegate Macbased tasks to support staff much more

similar PC-based functions in the past.

Menu-driven software on any machine may always seem slow compared to soft-ware that relies on command languages and keyboard macros. But the slowness of menued commands is often a purely subjective experience, possibly because we don't experience the time passing when actively inputting long commands, while menu operations force us to be idle. The best programs on either machine let ad-

vanced users graduate from the helpful menu prompts to keyboard commands in order to

gain speed. The Macintosh, which makes it so easy to create even such complex business graphics as financial diagrams and Gantt charts, then lets you copy them directly into text files, will likely prompt a greater demand for these visual aids from all quarters, including PC users. The IBM PC's support of color, at whatever resolution, is a big plus; color is essential in engineering applications and vital to business presentations. The Macintosh screen does not support color at this time. However, for as long as color monitors have been available, they

One subjective judgment that came as a surprise was that the Macintosh's blackon-white screen image is less tiring to read than the darker images of the PC's color monitor. Although we didn't take any exact measures of how long a person could sit at each screen before taking a break, we observed that people using the color monitor needed more breaks than those on the Mac. In verbal reports they attributed this difference directly to eye fatigue. We find that eyestrain associated with using color makes it more of a minus than a plus for many applications like word processing and database management. Finally, there is no really economic way to output color,

have had relatively little impact on the of-

fice environment, except for presenta-

truly first-time users. Experienced users at all levels would be able to delegate Macbased tasks to support staff much more quickly than they've been able to delegate the Mac: thinking tools and planning aids.

you might hope.

We're likely to see more of this type of application for the PC in the future. Until now, the complexity and slowness of project planning aids on the PC has limited their development to technical fields like

engineering and software development. Of course everyone thinks the Mac is generally more fun-sexier than the PCbut can it ever really replace the PC in the office? There's no question that the Macintosh introduces some incredible possibilities for graphics and typeset-quality text that the IBM cannot duplicate at present and may not be able to match for some time to come. But products like Microsoft's Word are gradually adding more type styles that take advantage of PC-com-

ur fantasy for the future is to have the PC and Mac work side by side, each doing what it does best. Until the two technologies have merged, large offices may find it convenient to use both machines.

patible laser printers.

Meanwhile, our fantasy for the office of the future is to have the PC and Mac work side by side, each doing what it does best. Until the two technologies have truly merged, large offices may find it convenient to use both machines. With the new IBM card that Apple announced at its January 1985 stockholder's meeting, this may not be a fantasy. Is it too soon to judge?

With the growing competition, we can look forward to some amazing developments for both machines. Let us simply concede that as the world changes, so will our view of it-and that this is probably not the last time we will look at the PC versus the Mac.

Diane Burns and S. Venit are IBM PC power users as well as Macintosh afficionados who contribute regularly to PC Magazine. Their book, Mac at Work, was recently published by Wiley Press.

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A New Standard in 2400 bps



Communications

The 1200-bps speed barrier has been broken; the new 2400-bps modems are fast, smart, and ready to go.

the summer of 1984 will misinform you that 1200 bps (bits per second) is the upper limit for transmitting information over standard phone lines. Ironically, 2400-bps moderns, which use a communi-

lmost any introduction to computer cations protocol called V.22 bis, have been available since 1982. These modems, which double last year's speed for typical PC communications, were until recently one of the industry's best-kept secrets. Now the word and the product are out, and 2400 bps is being hailed as the



new standard in communications.

A little background will help you understand why, in the fast-paced world of computers, the 2400-bps moderns were slow to debut.

The two most common communications protocols in the U.S. today are the Bell (as in Bell Telephone Company) 103 protocol and Bell 212 protocol. The Bell 103 protocol works reliably over standard phone lines up to about 300 bps, or roughly 30 cps (characters per second). The Bell 212 protocol works reliably up to 1200 bps, or roughly 120 cps. Because of its low price, the 300-bps modern was the unquestioned standard in PC communications until about 3 years ago. Then the price of the Bell 212 modems began dropping, and 1200 bos took over, for business communications at least.

Smartmodem 2400

Hayes Microcomputer Products, Inc. P.O. Box 105203

Atlanta, GA 30348

(404) 441-1617 List Price: \$899

Requires: RS-232 port, any compatible

communications software.

CIRCLE 685 ON READER SERVICE CARD Courier 2400

Microlink 2400 Telpac

U.S. Robotics, Inc.

1123 West Washington Blvd. Chicago, IL 60607

(312) 733-0497 List Prices: Courier 2400, Microlink

2400, \$699 each; Telpac, \$149. Requires: Courier 2400, RS-232 serial port. Haves-compatible communications software; Microlink 2400, Hayes-compatible communications software; Telpac,

128K RAM, one disk drive, DOS 2.0 or CIRCLE 684 ON READER SERVICE CARD

Fra 2 2400

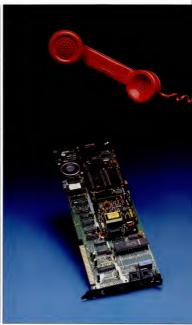
Microcom. Inc.

1400A Providence Highway Norwood, MA 02062

(617) 762-9310

List Price: \$799 Requires: RS-232 serial port.

CIRCLE 683 ON READER SERVICE CARD



Clockwise from left to right: the Microcom Era 2 2400, the U.S. Robotics Couner 2400, the Hayes Smartmodern 2400, and the U.S. Robotics Microlink 2400.



PC MAGAZINE • JULY 23, 1985

Setting New Limits

Other Bell protocols are faster than either the 103 or 212 protocol, but they require special, leased lines in order to work reliably. This is why 1200 bps was commonly cited as the upper limit for communications over standard phone lines. The V-22 bis protocol changed all that by pernitting reliable communications at 2400

As important as the V.22 bis protocol's speed is its origin: it was proposed in late 1981 at the recommendation of the Consultative Committee for International Telephone and Telegraph, or CCITT. Until now, two unrelated sets of data transmission protocols have been competing. One set, developed by AT&T, has been the standard in the United States and Canada. The other set, developed through CCITT recommendations, has been the standard in most of the rest of the world. As you might suppose, having two sets of protocols creates problems when transmitting data between the U.S. and Europe. Since AT&T participated in developing the V.22 his protocol at the recommendation of the CCITT, the protocol may well become the first worldwide standard.

In 1982, shortly after the V.22 bis protocol was approved as a CCITI recommendation, Concord Data Systems (CDS) and Racal-Vadio became the first companies to offer V.22 bis modems. Both modems cost about \$1,700, or twice as much as the Hayes Smartmodem 1200. These new modems, with their helty price tags, sold almost exclusively to the mainframe market.

Over the next year or so, several other modern manufacturers, including Rixon, Micorn, and Codex, announced their own V.22 bis moderns. Prices slowly dropped to below \$1,000, but sales still lagged to below \$1,000, but sales still lagged. Then in the summer of 1984, ATAC introduced its 2224 series of V.22 bis moderns. This move seemed to legitimize the new protocol and the market finally took off. Art be fall, 1984 COMDEX, at least a

half-dozen models of 2400-bps modems were announced for the PC market. The current list of players includes Hayes, Novation, U.S. Robotics, Microcom, and Racal-Vadic. Most of these modems were originally announced with a list price of just under 5900. But by February 1985,

the competition was already heating up, and U.S. Robotics dropped its price to \$699. Still lower prices are sure to come.

It's worth noting that this new generation of modems is more civilized than its 1200-bps modem forebears. Many of the 2400-bps modems for the PC market either come with their own software or have soft-

You can use other communications software, but the programs that come with the modems most likely offer all the features you need.

ware available at additional cost. Either way, the result is a fully integrated communications package that is easy to set up and easy to learn. You can use other communications software if you prefer, but the programs that come with the moderns most likely offer all the features you'll need.

Smarter Smart Modems

In many cases, the 2400-bps modems are smarter than the 1200-bps moderns. For example, one measure of a smart modern's intelligence is the number of functions it controls through software. The Hayes Smartmodern 1200, like most moderns, uses a bank of DIP switches to set the defaults for various options. The Construction of the Smartmodern 2400 has no DIP switches. It controls all functions through its on-board software.

Communications features on the 2400 moderns include auto-dial (the modern disable auto-dial (the modern disable phone and auto-answer (the modern answers the phone and establishes communications); auto-answer (tou make and manual answer (you make the phone and manual answer (you make the phone call, then switch the modern to data mode).

Like most modems, these are RS-232 internal or external direct-connect modems, meaning you plug them into your phone system with a standard, modular-plug phone cord. They have an additional connector so that you can plug a phone into the modem. This connector gives you the flexibility to switch easily between voice

and data in a single phone call. Set the modem for voice, and you can use the phone as usual. Set it for data, and the phone is disconnected.

Joining the Bandwagon

The AT&T amountement of its 2490bps moderns spurred action on several fronts. Tymner, Telena and Uniner, the three largest data communications networks, are all offering 2400-bps service on works, are all offering 2400-bps service on the control of the co

300 cities by the end of 1985. Several on-line systems that have already begun service at 2400 bps include Dow Jones News/Retrieval, NewsNet, Delphi, BRS, BRS/After Dark, Dialog, Mead Data Central's LEXIS and NEXIS, and Knowledge Index. There are even some bulletin boards that are already set up to handle the faster speed. Other systems, including MCI Mail and the Source, are "looking into' the possibility."

There are certainty situations where getting the faiter moders in worth experting the faiter moders in worth experise. If you do a great deal of file transfer between branch offices in New York San Francisco, for example, you can quickly gay for the one W. 22 bis most out of the savings in long-distance phone bills. Or, if you run applications profits on a remote computer, 2400 bps will be you worf, faster and more efficient you worf, faster and more efficient you getting information to your screen more quickly.

Other situations are more problematical. With systems like BRS and Dialog, you can probably save time and money by saving information to disk at 2400 bps, then reading it after you've signed off. But that tack largely eliminates the advantage of interactive on-line information searching. And 1200 bps is certainly first enough to handle typing at the keyboard and reading from the screen.

The point is simple: A 2400-bps modem is a significant improvement for file transfers and a few other special situations.

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But for most of us, there is little reason to rush out and buy a new modern until the 2400-bps standard becomes more widespread-particularly on services like bulletin boards and electronic mail systems. where faster file transfer will make a difference

As a practical matter, if you're shopping for your first modern, and you're about to spend \$400 or \$500 for 1200 bps, it's probably worth investing the extra money to get 2400 bps. It will save you from having to buy another modern in the not-too-distant future. But make sure you have a reason for being able to go that fast.

Reviewing the 2400-bps Vanguard

Now that you have decided you want a faster and smarter modem for your PC, the search begins for which 2400-bps modern best fits the bill. To narrow your search we have reviewed 2400-bps modems from Hayes, Microcom, and U.S. Robotics, manufacturers that were among the first to offer 2400-bps modems targeted specifically at the PC market. To help you decide, we tested these modems using PC-Talk III, Omniterm 2, and Crosstalk XVI to determine their manual dialing, auto-dialing, and repeat auto-dialing capabilities and to see how well they work at 300, 1200, and 2400 bps. We also examined each of the modem's unique features.

The Haves Smartmodem 2400

The Haves Smartmodem 2400, like the Smartmodern 1200 before it, is an external modern. It connects to your PC through the RS-232 port, also known as the serial or communications port.

Smartmodem 2400 shares with Smartmodern 1200 such features as manual dial. manual answer, auto-dial, and auto-answer. But Hayes has done more here than simply add another, faster communications protocol. Among other things, it has added a synchronous mode to allow communications with mainframes. It has also removed the DIP switches found behind the front cover of the 1200. Options are now set with keyboard commands and stored in a nonvolatile EEPROM (electronically erasable programmable readonly memory).

The 2400 has a smarter auto-dial feature than the Smartmodem 1200. If the

2400 dials a number and there is either a busy signal or no dial tone, it will abort the call. The 2400 also adds an enhanced command set, complete with a subset of new

self-test and diagnostic commands. These features add versatility to the Smartmodem 2400, but they also create a problem. The Smartmodem 1200 has be-

For most of us, there is little reason to rush out and buy a new modem until the 2400-bos standard becomes more widespread.

come so much of a standard that virtually all communications software for personal computers is designed to work with it. Ironically, many of the features in Smartmodem 2400 keep the modem from being fully compatible with programs designed for the 1200. The smarter dialing feature, for example, sends messages back to the screen such as "no dial tone" or "busy." These messages can confuse some programs and foul up the redialing routine.

Although the 2400 can be set up to act very much like Smartmodem 1200, thus eliminating these incompatibilities, the manual isn't clear on how to do so. One glaring oversight is the lack of a translation table to show which electronic options on the 2400 correspond to which DIP switch settings on the 1200. If you use programs like Crosstalk XVI or Relay that demand specific DIP switch settings, this is a serious problem

The Smartmodem 2400 looks very much like the 1200. The front panel on both versions has the same set of eight status lights; they differ only in the model name on the upper left-hand corner. Four of these lights deal with communication status. They light up to show when the modem is on-line, when it is talking to another modem, and when it is sending or receiving data. The other four lights tell you whether the modem is on and ready. whether your PC is ready, whether the auto-answer feature is active, and whether the modern is set for high or low speed.

The rear panel on the 2400 has two

phone connectors as opposed to one on the 1200. This minor, but welcome, addition lets you plug a phone directly into the modem. One thing missing from the back panel is a volume control for the speaker. (The speaker lets you listen to a call in progress.) The 2400 controls the volume with a keyboard command.

The Smartmodem 2400 is compatible with four modern protocols: Bell 103 at 0-300 bps, Bell 212 at 1200 bps, V.22 at 600 bps or 1200 bps, and V.22 bis at 2400 bps. The V.22 protocol is the CCITT equivalent to the U.S. Bell 212 protocol. In principle, it is possible for a Bell 212 modem in this country to communicate with a V.22 modern in Europe. In practice, however, according to people who have tried it, there are of en difficulties. The V.22 protocol included in the Smartmodem 2400 eliminates these difficulties at 1200 bps.

Changing Gears

Unfortunately, in adding the new protocols, Hayes has also added an unnecessary complication. When typing commands to the Smartmodern 2400, you can't assume that the modern will automatically adjust its speed, the way the Smartmodern 1200 does

A new command for the 2400 sets the modem for either Bell protocols or CCITT protocols. If set for Bell protocols, the modem will not recognize 2400 bps. If set for CCITT protocols, it will not recognize 300 bos. This means that when changing from 2400 bps to 300 bps, you must reset the modem before you reset your software. This "feature" is an unfortunate road-

block. Granted, the Smartmodem 2400 needs a command to choose between CCITT and Bell protocols at 1200 bps. But it should be able to recognize 300 bps and 2400 bps and set itself accordingly

It remains to be seen whether the new Haves command set will replace the old. or if it can be effectively incorporated into programs designed for the older Smartmodems. For now, it may take some tinkering to get this modern working with your favorite communications software.

To avoid some of this inconvenience you might consider Haves's Smartcom II Version 2.1. This program was designed for the Smartmodem 2400 and should make it easy to get the modern running. If

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you own an earlier version of Smartcom II, you can upgrade to the 2.1 version for \$10 to \$25, depending on the release number.

The Courier 2400 and Microlink 2400

One way to categorize modems is to divide them into internal and external. External modems, such as the Smartmodem 2400, sit outside your computer and connect through the serial port. Internal modems plug into a slot inside your PC, where they remain out of sight.

Some people prefer external moderns, because they don't fill up an expansion slot. Others prefer internal moderns because they don't clutter the desk. U.S. Robotics offers one 2400-bps modern in each

category.

The external modem is the Courier 2400. This modem has much in common with the Smartmodern 2400, and even more in common with the Smartmodern 1200. The Courier 2400 is what you would expect if you startmodern 1200 and added the 2400-bps feature. That's not surprising, considering that some content of the courier of the

The Courier 2400 is slightly larger than the Smartmodern 2400 but otherwise follows the same overall design. The front panel has a bank of nine status lights. Eight of these are identical to those on the Smartmodern. The ninth indicates when the Courier 2400 is in test mode.

The rear panel, like the one found on the Smartmodern 2400, has an on-off switch plus four connectors—one for the serial port, one for the electrical connection, one for the phone line, and one for an ontional phone.

Unlike the Smartmodem 2400, the Courier 2400 uses DIP switches to set various options. The switches are accessible through a cutout on the underside of the modem.

A Ouick Reference Card

A nice feature of the Courier 2400 is a diagram on the bottom of the modern that explains the switch settings. Other useful information on the underside includes an explanation of the status lights, a list of RS-232 pin assignments, and the modern's entire command set. With all this informa-

tion on the modern itself, you'll rarely need to refer to the manual.

The command set on the Courier 2400 is nearly identical to that of the Smartmodem 1200 (not 2400). There is at least one useful addition however: on-line help-Type "AT!" at the keyboard, and the modem will list its commands on screen. Oth-

One of the notable things about the Era 2 2400 is that it is an integrated package; modem and software fit hand in glove.

er help commands will list current settings for the modern.

The Courier 2400 is compatible with the Bell 103 protocol at 0 to 300 bps, the Bell 212 protocol at 1200 bps, and the V.22 bis protocol at 2400 bps—all in asynchronous mode only. Unlike with the Smartmodem 2400, you needn't indicate the proper protocol. When you give it a command, it detects the incoming speed

Features on the Courier 2400 include manual originate, manual answer, auto-dial, and auto-answer. The auto-dial function is essentially identical to that of the Smartmodern 1200. Tell the modern to make a cell, and it picks up the phone and diab blind. As with the Smartmodern, the Courier 2400 has a speaker so you can listen to the call as it is made. (The volume control is on the bottom of the modern.)

Easy Access DIP Switches

and sets itself to match

The Microlink 2400 is the internal version of U.S. Robotics's 2400 modem. Except for the physical description, it is largely identical to the Courier 2400. The planting worth noting its that the DIP switches are located on the rear of the modem. With the Microlink 2400 in your PC, the whiches face courands to the rear of the machine. This placement lets you get at them without having to take the cover off your computer. The one important feature the Micro-

link 2400 lacks is the bank of status lights, but that's true of any internal modem. Whether you consider that a plus or a mi-

Both of U.S. Robotics's modems worked fine during testing with PC-Talk III. Omniterm 2, and Crosstalk XVI. As Hayes-compatible modems, they should work with most other communications

programs as well.

Also worth mentioning is U.S. Robotics's communications program Telpac.

This program, which costs 5149, is designed to work with both the Microlink 2400 and Courier 2400—or any Hayes-compatible modern. Telpac is both easy to use and sophisticated enough to be the only program you may ever need. It's definitely worth a look.

The Microcom Era 2 2400

The Microcom Era 22400 internal modern is equivalent in most ways to the Microlink 2400. Here again, the modem's features are what you would expect if you started with the Smartmodern and added 2400 bys; Microcom's 1200-bys internal modern is a close clone of the Smartmodern 1200B (the internal version of the Smartmodern 1200B.

As with the U.S. Robotics modems, the Era 2 2400 uses DIP switches to set various options. Unfortunately, these are located on the face of the modem board, meaning you have to take the cover off your computer to get at them.

The Era 2 2400 has also stayed with the Smartmodern 1200 command set, so you won't find any new features on this modem. On the other hand, there is one compensation. Microcom claims the Era 2 2400 is 100 percent Hayes-compatible.

Communications features on the Era 2.

2400 are nearly identical to those on the Microlink 2400. The Era 2 is compatible with the Bell 103 protocol at 100 300 bps, and the V.22 bis protocol at 200 bps, and the V.22 bis protocol at 200 bps, and the V.22 bis protocol at 2000 bps, and the V.22 bis protocol at 2000 bps, and the v.25 bis protocol and 2000 bps, and the V.25 bis protocol and 2000 bps, and the V.25 bis protocol and 1 in asymmetry on the protocol when you trype a command, it detects the incoming speed and sets itself accordingly.

Other features include manual originate, manual answer, auto-dial, and autoanswer. As with the Microlink 2400, the auto-dial feature on the Era 2 2400 dials blind. Here too, the modem has a speaker

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2400-BPS MODEMS

so you can listen to the call.

Hand-in-Glove Software

An added bonus when you buy the Era 2 2400 is that it comes packaged with its own communications program. The program doesn't have a name as such, it's simply part of the package. In fact, one of the notable things about the Era 2 2400 is that it is a completely integrated package; modern and communications program fit hand in glove, and the manual shows you what you need to know about each what you have the know about each what you have the know about the properties of the hard when you have the sum of the properties when you have you ha

Like Telpac, the Era 2 program is both easy to use and sophisticated enough to handle most communications needs. Unlike Telpac, it isn't available separately and won't run on other modems.

One feature worth special attention in the En 2 software is Microcom's MNP protocol. MNP has been getting attention lately as a possible new standard in error-correcting protocols. The closest thing to a standard now is Xmodem, widely used for transferring files over phone lines. MNP, however, will catch and correct errors' missed by Xmodem.

Another intriguing point about MNP is that it can be stup as a "link level" protocol, meaning it will check and correct all
data, no Just data in file transfers. When
communicating with MNP, you can pick
up a phone and literally shout into it without causing any errors. This resistance to
errors can be very useful if you're saving
information from an on-line session with
Dialor or MCI Mail.

MNP is now supported on MCI Mail, and Uninet is in the process of adding MNP along with its 2400-bps access numbers. The file transfer feature of MNP has also been incorporated in RBBS software, one of the most popular bulletin-board programs for the PC.

Keep in mind that the 2400-bps modern market is still new. Prices are likely to drop some more before they stabilize. Several additional players in this game haven't yet shipped their products. If you don't absolutely need a 2400-bps modern, it may pay to wait. If you do need one now, any of these moderns will do the job.

M. David Stone is a frequent contributor to
 PC Magazine, who specializes in telecommunications.

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Let there be sight



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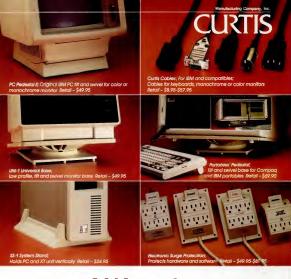
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2400-bps Modems:

He Who Hesitates Is Smart

I hould you buy one of the new 2400-bps modems? If your company is the size of the Bank of America or General Motors and has telephone links that are kept very busy each day at 1200 bps, the answer is yes. Just make sure, however, that you buy the same brand of modem for all locations and that all of your communications managers are thoroughly briefed on 2400-bps procedures and error-checking protocols. On the other hand, if you're a

small businessperson, a professional on-line researcher, or "Joe and Jo-Ann Consumer," you should proba-bly start or stay with 1200-bps Hayescompatible units. At the very least, you'll be better off if you wait until things have sorted themselves out in the marketplace before taking the plunge

into 2400-bps communications. "In large measure, 2400-bps communications is an emerging technology." says Ken Krechmer, who is president of Action Consulting in Palo Alto, California and designed the Prentice Popcom X 100 modern. "It's not at all ready for the average consumer. It's not ready in terms of its specifications. It's not ready in its implementation. And it's not ready in its errorperformance."

Reason 1: No true 2400-bps standard eviete. As Krechmer points out, the most im-

portant concern regarding this new equipment is that no true standard for 2400-bps PC MAGAZINE • JULY 23, 1985



Before you rush out to buy a 2400-bps modem, consider five reasons not to. You may regret making a hasty purchase.

communications is currently available. A committee of representatives from 84 United Nations countries has composed a recommendation that runs about 22 pages and offers a general outline of what a 2400bps modem should do. But that's all. It doesn't describe exactly how that modem should work. The committee left those details to the imaginations of the engineers and product designers at the various companies that produce 2400-bps units. Consequently, the definitive 2400-bps modem doesn't exist in today's marketplace. This situation is in marked contrast to

the growth of 1200-bps communications. For most of the last decade, virtually every 1200-bps modern produced in the United States has been designed and built to conform to the Bell 212A standard issued by AT&T in 1976. The standard goes on for hundreds of pages and covers every aspect of the modem's operation. And, to back it up, AT&T made a working model that physically demonstrates how the standard should be implemented. To be sure AT&T has introduced

a Bell 2224 standard for 2400-bps communications. But, while the standard is generally well thought of in the industry, today's slimmed-down AT&T has far less clout and far more competition than it did before divestiture. Consequently, most authorities doubt that this AT&T standard will become the 212A of the 2400-bps world any time soon.

To more fully understand the kinds of incompatibilities that can arise because of the lack of a definitive 2400-bps standard, you have to be aware of the Comité Consultatif International Téléphonique et Télégraphique (Consultative Committee on International Telephone and Telegraph or the CCITT) and its various recommendations. The CCITT is an arm of the International Telecommunications Union. which, in turn, is part of the United Nations. It produces two types of recommendations: X and V series. The X series covers issues related to wide-area networks. Recommendation X.25, which covers packet switching, is probably the best

The V series covers issues related to data communications over switched telephone networks (ordinary telephone lines). The CCITT recommendation for 1200-bps modems is V.22 (pronounced vee-dot-twenty-two). The recommendation for 2400-bps modems is called V.22 bis (bee-sss). The French word bis means secondary, and V.22 bis can probably best be thought of as V.22-A.

Since the frequencies and format for 2400-bps communications are clearly defined, V.22 bis-compatible moderns from, say, Manufacturer A and Manufacturer B will have no trouble talking to each other at that speed. But the serpent of incompatibility begins to rear its ugly head regarding fall-back speeds. For example, suppose you want to connect with a computer at your home office using your trusty Hayescompatible 1200-bps modem and that computer is equipped with an autoanswer V.22 bis-compatible modern. When the home-office modern picks up the line, it begins issuing the V.22 bis answering signal. Receiving no recognizable 2400-bps response from your unit, it falls back to 1200 bos and tries again.

But according to the V.22 bis recommendation, the V.22 bis falls back to the 1200 bps format, CCITT V.22, not Bell 212A. These two formats involve two completely different sets of frequencies. It is possible to make the V.22 and Bell 212A modems talk to each other, but it is usually a fluke when it happens. The two formats were never intended to be compat-

If you want to talk to your home office, you'll obviously need a V.22 bis-compatible modem. Let's suppose you buy one and communicate effectively at 2400 bps for 2 days. But, on the third day, the quality of your phone connection is so bad that 2400-bps communications is impossible. So, the home-office modern falls back to V.22 to continue the session at 1200 bps, your new modem falls back to-212A. The incompatibility serpent strikes again in another form: modern manufacturers have decided it makes more sense in the United States to fall back to 212A than to V.22, the CCITT recommended fallback. II S modern manufacturers are modi-

fying the recommendation in other ways as well. Many obviously believe the auto-dial commands called for by V.22 bis are unworkable, so such companies as Hayes Microcomputer Products, AT&T, and Concord Data Systems have each implemented their own dialing commands (see M. David Stone's article on moderns, "A New Standard in Communications: 2400 hns " in this issue)

Manufacturers are also taking the initiative to make changes regarding "carrier-

Many believe 2400-bos communications and V.22 bis will eventually give way to something else. The only questions are. To what? and When?

off disconnect." According to V.22 bis, a modern should disconnect if it loses the carrier signal coming from the remote modem for 40 to 65 milliseconds. But, with the growing popularity of the call-waiting feature on many telephone lines, the V.22 bis recommendation is increasingly becoming unacceptable in the United States. To enable their modems to ignore the interruptions caused by call-waiting signals, many U.S. manufacturers set their units to hold onto the connection for 600 to 700 milliseconds (or more) after the carrier is lost. (On some modems, you can control this time by setting the \$10 register on Haves compatibles and other so-called smart modems.

Reason 2: More errors are likely at 2400

bps. At 2400 bps, a modern must pack twice the number of bits into the same second of time that it does at 1200 bps. That means each bit must be smaller, that is, it occupies less time, making it more susceptible to smaller (shorter) bursts of electrical noise or interference. It also means that a burst of noise of a given duration will wipe out twice as many bits at 2400 bps as it would at 1200 bps. When you factor in what is generally agreed to be the increasingly poor quality of post-divestiture AT&T phone lines and add the often substandard connections offered by some alternative long-distance carriers, it is obvious that some form of error-checking protocol may be necessary for even routine file transfers at 2400 bps.

As the current de facto standard, Xmodem, the widely supported public-domain protocol created by Ward Christensen, would seem to be the obvious choice. But, it has two major disadvantages that make it less than ideal for 2400-bps communications. First, the protocol can be fooled under certain circumstances, and the likelihood of those conditions arising at 2400 bps is greater than at 1200 bps.

Second, Xmodem requires the sending computer to retransmit a block of data if it was received in error. If the error rate is higher, more time will be spent retransmitting blocks of data. Consequently, under some conditions, it may actually take you less time to send a file at 1200 bps than at the faster, more error-prone speed.

Unfortunately, a successor to Xmodem has yet to emerge, although Microcom is pushing its MNP protocol, and Tymnet is campaigning for its X.PC protocol. But neither protocol is widely available in communications software, though that will change. The chances are that when these protocols do become available, you will have to buy a new communications program, pay for an upgrade to your current software, or switch to the program supplied by the modern manufacturer.

Because they are complex and require users to pay licensing fees, neither MNP or X.PC will probably be the basis for publicdomain or user-supported software anytime soon. It is worth noting, however, that Ward Christensen has recently returned to the drawing board to create Ymodem, a protocol that addresses many of the weaknesses of his original. (One program that supports Ymodem, X.PC. Kermit, 16-bit CRC, and many other protocols is Chuck Forsberg's Pro-YAM from Omen Technology in Portland, Oregon.

Reason 3: V.22 bis may soon be re-

Like death and taxes in real life, technological obsolescence is a given in the microworld. Many believe 2400-bps communications and V.22 bis will eventually give way to something else. The only

questions are. To what? and When? In France, owing to the generally poor quality of telephone connections, the emerging specification of 2400-bps communications is CCITT V. 26 ter (once again, you can think of this a V.2-8.B.). The V.26 ter recommendation increases the bandwidth (he diameter of the communications pipe) available to each modeem by allowing both to use the identical frequency. A sophisticated chro-anceling technique is used to enable each modem to distinguish incoming signals from those it is sending. Because V.26 ter offers a better error performance, it could quickly make V.22 his obsoles.

In data communications, the speed progression is from 300 bps to 1200 bps to 2400 bps to 4800 bps to 9600 bps. It is thus natural to assume that 4800 bps will be the next step. However, it seems quite probable that the 4800-bps step will be skipped and things will directly proceed to 9600 bits per second. Gamma Technology, in Palo Alto, California already offers a unit, the FAXIT-96, that is capable of 9600-bns (half-duplex) communications over ordinary telephone lines. At a single unit price of \$2,000, it isn't cheap; however, it does work and it exists today. And the technology won't be that expensive forever. (The CCITT standard for half-duplex 9600-bps communications is V.29. The full-duplex standard is V.32.)

Of course, no one can predict when V.22 bis will be replaced. But, it may be a mistake to assume that the support it is receiving from so many modern manufacturers presents a long-term commitment. After all, most modern manufacturers must offer a V.22 bis unit today, if only to maintain an aura of competitiveness.

Reason 4: A speed of 2400 bps is of little benefit to many.

For many companies the benefits of 2000-bps communications are too powerful to ignore. Officials at Minneapolisated IDS Financial Services, for example, estimate that employees spend over 4,000 hours each year using Tymnet at a speed of 1200 bps for an annual outlaw for around \$85,000. Because, at this work of the property of the pr

Travelers Insurance salespeople use portable computers to go on-line with the

company's mainframe for rate quotations and other information as part of the presentation to the prospective client. The presentation often takes place in the client's home. Connect-time charges are not as much of a factor. But, the faster the information is delivered to the salesperson's computer, the more effective the presenta-

The most powerful argument for waiting to purchase one of the 2400-bps modems is that prices are virtually certain to fall

tion will be. Needless to say, Travelers is

very interested in 2400-bps moderns. Mainframe programmers or anyone who routinely accesses a mainframe competer that uses a full-acreen protocol are also candidates for a 2400-bps modern. At 200 bps, it takes early 17 seconds to pairs a full screen. Athough, far from idea, the 8.3 seconds required at 2400 bps is much more acceptable. And white the cost benefit fund off its ladey to be vague, our maintained that provide employees with companies that provide employees with companies that provide employees could benefit in many ways, not the least of which is usualcited overtimes.

But if you do not routinely transfer large files, it is doubtful that an investment in a 2400-bys modern will pay off, particularly if you use your PC primarily for on-line research. Most commercial databases charge a higher rate if you sign on at a higher speed. For example, the 1200-bys rate may be doubtle the 300-bys rate, and the 2400-bys rate (on the systems that support it) might be triple the 300 bys rate.

But, as any on-line researcher knows, when you're going after information you usually spend most of your time telling the database mainframe what you want and waiting while it conducts is search. Since the speed you are using has no effect on how quickly the mainframe locates therequested information, you will spend as much time waiting at 300 bps as at 2400 bps, but you may be charged three times more the 2400-bps time. The actual informer than 2400-bps time.

mation you download may not be more than a page or two, if that. So you won't see substantial savings there.

What's more, you may find that you have to place a long-distance call to make to place a long-distance call to make to place a long-distance call to such a 2400-lsp packet-switching node. At this writing, Tymer offers about 80 numerications. Union offers about 80 numerications. Union offers about 80 numerications under the such as the summer of the s

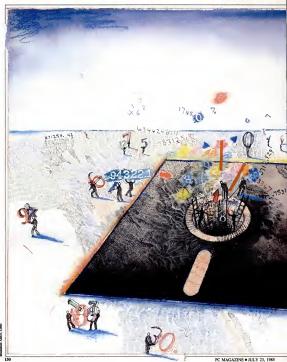
Reason 5: Prices are certain to come down.

The last and most powerful argument for waiting to purchase one of the 2400bps modems is that prices are virtually certain to fall. If you follow the ads of the mail-or-der houses in PC and other magazines, you will see that competition is already having an effect. Unless you need and can clearly justify the expense of 2400-bos communications right away, it makes sense to wait before making your investment. Several months from now the 2400-bps picture may be clearer. A consensus may have begun to develop around a genuine standard. The whole question of error-checking protocols may also be more definite. And, even if these things do not happen, you can count on prices being lower, so you may still be better off than someone who makes a purchase right now.

Conclusion

Glossbernner's Twelfth Rule for Softwere Success is if you can, wait And it applies equally well to computer hardware and peripherals. As time passes in the micro world, capability goes up and prices come down. And in this case, even computer owners who have no need for the new high-speed modern will get more bits for their backs because as 2600-bps moteral to the second of the property of the property of the property of the property of the may turn out to be the main benefit of the new 2400-bps moderns.

Alfred Glossbrenner is the author of the newly revised Complete Handbook of Personal Computer Communications.



Macola's Accounting Software: A Major Asset

Derived from its minicomputer relative, Macola's Financial Software supports multiple concurrent users on a LAN. You can also obtain the source code and customize its many features.

A sever more-powerful packages join the ranks of Pc-based soft-arises misicomputer from microcomputer accounting systems has been closing setably. But while a number of Pc-based packages can almost match their minicontraction of the packages can almost match their minicontraction of the packages can almost match their minicontraction of the contraction of their minicontraction of their minicon

Macola Financial Software from Macola, Incorporated of Marion, Ohio addresses both of these limitations. Using a Novell local area network (LAN), Macola's software allows simultaneous use of any of the nine modules at several PCs. And you can obtain the source code if you have the wherewithal to modify the applications to your needs.

Although Macola's system is relatively new to the microcomputer market, the

Mini-Computer Business Applications (MCBA) package from which it was derived has been on the minicomputer market for years. Like MCBA, the Macola packages for the PC are written in COBOL. (Macola uses Ryan-McFarland CO-

BOL., also known as RM COBOL.)
Macola's nine fully integrated modules
include General Ledger, Accounts Payable, Accounts Receivable, Customer Order Processing, Inventory Management,
Purchase Order/Receiving, Fixed Assets
and Depreciation, Payroll, and Bills of
Materials Processine.

Each module includes object code and requires an RAM COBOL run-time module. The source code will cost you an additional S350 per module. If you meed to tailor the system but aren't up to diving into the source code yourself, Macola will perform custom modification to your specifications. The company maintains a staff of programmer/analysts who will visit your shop to determine the modifications you

The majority of users (about 80 per



cent) elect to use the system without modification. Most of those who require changes or enhancements rely upon Macola or one of their authorized dealers to make them. Macola claims that many of the minor changes requested have already been implemented for other clients and are therefore available at low cost.

All for One, One for All

The more cophisicisated your accounting system becomes, the more likely it is that several users will want simultaneous access to accounting data. Maintaining your general ledger and inventory records, accounts receivable records can be a time-consuming process. An order entry system is effective only if, every time you need to enter an order, you can quickly verify inventory counts or quote an appropriate ventory counts or quote an appropriate receivable records is often useful coly if you can gain immediate access to the data.

you can gain immediate access to the data.

Macola utilizes a Novell LAN to grant
concurrent access to accounting data by
multiple workstations. Record- and fitelocking routines automatically prevent
data loss that could otherwise result if two
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Record- and file-locking routines automatically prevent data loss that could otherwise result if two users tried to update the same record at the same time.

same time. If you're modifying a record at your workstation, and someone at a different workstation attempts to modify the same record, he or she will receive a "neord in use at another station" message. Without this feature, information could be inexplicably destroyed. The routines that accomplish this multi-user file protection are intelligent enough to allow one or more persons using read-only functions to access the same data without risk.

We have not Microb on both Novell G-Ne (a linear, or three configuration, 10), and Novell S-Net (a star, configuration), and Novell S-Net (a star, configuration). All policy lands in the company's average multi-seer impressive. The staff at Macchi indicated to use that the company's average multi-seer installation is running from four to six PCs in the study in the company's average multi-seer installation is running from four to six PCs in the study in t

ly testing a MicroFocus COBOL version of the system, which uses a more efficient machine language format, and should increase performance in multi-user environments to rival that of the minicomputer version.

While it is feasible to run Macola's single-user financial accounting modules on a floppy disk-based system, a hard disk is highly recommended. Of course, the multiuser version requires a hard disk-based LAN.

Installation of the Macola software is simple and straightforward. You just copy all of the diskettes furnished with the package and the COBOL run-time module onto your fixed disk. System implementation routines help you build data files for all of the applications you are installing.

General Ledger

To start using the general ledger module, you first define the "company reord"—which establishes such information as your company's name and address (for report titles)—and choose the different accounting modules you will be using.

As with any general lodger package, defining your chard of accounts is the most important task to be performed when installing the system. Your primary account number may contain up to five additional alphanumerics for the subcount number. In defining your account numbering structure, you should take came to 'marry' the way in which you need to report your financial information with imagency the property of the

In addition to the organizational reports that you can perpen with the subaccounts, Macola has a unique feature that lets you perparts subaccounts for presentation as a "financial entity." A financial entity is assigned a five-character alphanmente name and is defined as a grouping of up to 5 ranges of subaccounts. It does not be up to 5 ranges of subaccounts, let was constituted for your enterprise and track accounting performance at various levels of responsa-

For example, you could call subaccount 10 "Drahing department" and subaccount 19 "Sales department" at Plant Location 1, then furnish the drafting and sales department managers with performance information for their departments, based on a detailed analysis of actual versus budgeted expenses for each subaccount. Next, you can define Plant Location 1 as financial entity LOC 1 consisting of all subaccounts 10 through 19. By combining the analysis reports for all subaccounts that financial entity LOC 1 comprises, you could submit an analysis of the plant's performance as a whole to the manager of Plant Location 1.

When you set up your chart of accounts, you can specify subtotal "'breaks'' within the accounts and insert them into the basic trial balance report, enhancing its usefulness significantly.

usenumes signinearly.

Certainly, small businest and income statement, but because of their continual focus on cash, they are often even more interested in a funds flow statement. While setting up each account, you can specify its relationship to the funds statement ment as, for instance, either a cash item, current asset, current flashily, funds item, current sased, current flashily, funds item, current sixed, current flashily, funds item, current flashily, funds item, current flashily, funds item, set for income, or nooflands item. Using these classifications, it is a set of the current flashily funds item.

One very useful feature offered by Mucola's Germal Ledger lets you use a "compression code" to establish the data reduction frequency of your accounting data. The system maintains the detailed transactions posted to each general ledger account until you decide to compress, or reduce, this data. To do so, you specify a compression code for each account that expresses your choice: to leave the data

uncompressed (that is, maintain all details), to compress all transactions for each period or day into one transaction, or to compress all transactions into one transaction for each posting source by day or period. This allows you to maintain as much detail as required, but minimizes the

amount of disk space used for storage. The system maintains balances for the current; year and prior year, and records budgeted amounts for each month. It creates a report layout by specifying what data will appear in each column of a report, thendefines:the account or range of accounts that will appear on each line. Once a report layout is specified, it can be printed for the company as a whole, for one profit of (a unique subaccount number), or for any of the financial entities you have defined.

Accounts Receivable

Since the accounts receivable modules in fully integrated with the other Macola accounting modules, you must begin by configuring its use for your particular business, as shown in Figure 1. Once you have established your chart of account numbers of account numbers to which the transactions generated in the accounts generated in the accounts generated in the accounts of the contraction generated in the accounts of the contraction generated with the posted (for instance, accounts receivable control accounts), fireight, finance charges, and so on), You can

arrange to distribute financial accounts associated with aleas and other charges at the time a receivables transaction is posted or, alternatively, have these transactions distributed to a single account that you specify for each individual customer? Necessies posted to different general ledger control accounts. Doing so increases control over necessions associated with different yopes of customers and helps segret complyors exceed the control accounts.

trade receivables. By classifying your customers into various meaningful categories, vou can considerably increase the effectiveness and clarity of your receivables reporting. Figure 2 shows you how to establish a customer code to classify each customer by type, then use the results as a selection field to produce accounts receivable and sales analysis reports. Agings can be prepared for the company as a whole, or for specific customer types. This field can also record which person in your company has collection responsibilities for which customer, allowing you to print a separate receivables aging list for each employee that shows only those receivables he or she is responsible for collecting.

You can use six different summarization methods to generate alses analysis reports from the accounts receivable system, summarizing your data by customer, customer bye, sales volume (for instance, all customers buying over 10,000 units, salesman number, state, or sales territory. The report shows current- and prior-year sales, costs, and gross profit.

Customer Order Entry

Macola's customer order entry is quite sophisticated and requires you to install the accounts receivable and inventory immagement modules. The inventory-item files verify item codes, item descriptions, quantities on hand, and quantities available. The system uses the accounts receivable customer records for sames and addresses, credif-limit verification, and and thefaults (everying warehouse, psymmotory of the control of t

ship-to code, and tax status. To facilitate

and speed this process, the default items

Figure 1: A/R control file. A control file in each module allows you to customize the module to fit your needs.

A/N CONTROL FILE NAINTENANCE Microcomputer Distributors CHANGE/INQUINE 1. AGE BY INV OR DUE DATE 2. # AGE DAYS IN PERIOD 1 3. # AGE DAYS IN PERIOD 2 4. # AGE DAYS IN PERIOD 3 5. # AGE DAYS IN PERIOD 4 120 AGING PERIOD 1 DESCRIP CURRENT 7. AGING PERIOD 2 DESCRIP 30-60 DAYS AGING PERIOD 3 DESCRIP 61-90 DATS AGING PERIOD 4 DESCRIP 91+ DAYS 10. FIN CHG X - LEVEL 1 11. LEYEL 1 CUT OFF . 12. FIN CHG I - LEVEL 2 .000 13. AGE PAST DUE BY INV OR DUE DATE 14. # DAYS PST DU FOR FNCHG 5.00 15. MINIMUM FIN CHANGE 16. PRINT CO NAME ON STHT ? ITEN NUMBER TO CHANGE ?

from the accounts receivable customer records appear at each prompt on the order-entry screen. When you press the Return key, the system accepts the default; you may, however, enter a different value at the propure.

One problem everyone faces when first automating receivables records is that of having to remember each customer's number or code. To find the appropriate customer records if you are unsure of a customer number, you can press the F8 key for an alphabetic search on the customer name field. Once you enter as much of the customer name as you know, the system presents you with a list of customer names and numbers that begin with the character string you entered. Selecting the desired customer number returns you to the orderentry screen. This facility is available at various other key points in the Macola accounting modules, including the point at which you are prompted for inventory item

numbers in completing a sales order. The variety of products handled by different businesses often makes it very difficult to use "packaged" software to automate the sales order-entry function. One of the most problematic areas to deal with when using an order entry package is pricing. However, Macola has attempted to create a product that spans a broad spectrum of businesses. The module's eight different pricing structures illustrate its flexibility. Among other methods, you can specify a price for each item for each customer, specify prices for each customer by product type, and specify prices by customer type for each product type. All eight methods allow you to establish different prices based on the number of units ordered. You can use one or more of the eight pricing structures simultaneously and establish the order in which they are applied.

Both the order entry module and the accounts receivable module produce sales analysis reports. Those forming part of the order entry module include unit sales data in addition to dollar sales, product costs, and gross profit amounts. The program allows you to print listings by item, product category, or in sales-wolume sequence. Also, sales-history reports are available that compare sales figures for the current year to those of the prior year.

Macola's order entry module is not without its limitations. One of the most significant is that the quantity order is limited to a 4-digit integer. Thus, any business selling large quantities or recording sales in partial units may not be able to

One problem everyone faces when first automating receivables records is that of having to remember each customer's number or code. use the order-cuty system without modifying the software.

Another limitation of the program is that the selling unit of measure must be the same as the inventory-stocking unit of measure. You may have trouble convincing your customers that the unit of measure that you use to record stocked merchandise is also the most appropriate one chandise is also the most appropriate one for billing. How would you tike to be billed for 0.0833 gross of widgets when you ordered a dozen?

Again, you must remember that, unlike the restrictions that most microcomputer packages impose, minor limitations in the basic package can be changed. You may buy source code and modify the package vourself or contract with Macola or anoth-

er company to implement the necessary enhancements.

Inventory Management

We were surprised to find that you must complete three different data entry screens to record a single new inventory item. At first blush this requirement appeared to be unreasonable. However, this investment of time is well worth the effort, since all the data you associate with each inventory item will help you streamline your order entry and inventory operations as well as manage and control the inventory. The first screen requests you to enter the item number, description, beginning quantity on hand, prices, and so on, as illustrated in Figure 3. In addition, you can enter various data to be used as defaults for the item in the customer order entry and purchase order modules-such as base price, weight, unit of measure, stocking

The second screen captures such inventory management data as the recommendded minimum order quantity, average usage per period, usage weight factor, safety stock, and so on-information the system requires to calculate conomical reorder quantities. When the system is up and running, it recalculates much of this data as an automatic function.

The third screen prompts you for infor-

location, and tax status.

CUSTONER FILE MAINTENANCE Microcomputer Distributors CHANGE/INQUIRE . 1. CUSTONER NO 2. HANE MICHO INDUSTRIES, INC 3. ADDRESS-1 123 MAIN STREET 4. ADDRESS-2 CALCYBO 5. CITY 6. STATE IL 7. ZIP CODE 11111 8. COUNTRY BOB ALEXENDER 9. CONTACT 10. PHONE NO 312/555-1212 11. SALESMAN NO 002 TON SHITH 12. CUST TYPE DIST 20. A/H ACCOUNT NO 1110-00 13. BAL METHOD Accounts receivable trade 14. STHAT FREE 21. SHIP VIA F FEDERAL 15. CRDT LINIT 12,000 22. TERMS CODE 2 2/10 NET 30 16. CRDT RATE 23. DISCOUNT X 17. FIN CMS 1 24. TAXABLE 1 18. LOCATION 25. TAX CODE TLC 19. TERRITORY ILLINOIS -- COOK COUNTY ITEN NUMBER TO CHANGE ? __

Figure 2: Customer file maintenance. Besides the name and address, each customer record contains defaults to be used in the order entry function. mation describing the relationship each data item bears to the other integrated modules. When a manufactured item is issued, the system will search the bills of materials module for the appropriate bill and relieve all required components from inventory. An inventory item may be defined as stocked or nonstocked and can be controlled or nonscorefuled. If an item is not controlled, the other entry module will not verify inventory availability or allowed to the control of the control

Varying amounts of the same item may be stocked at different warehouse locations; the program will keep track of each quantity by location. As you receive each item into inventory, either through direct entry into the inventory module or through the purchase order and receiving module, a prompt asks for its inventory location. You must specify a warehouse location for all orders. As soon as an item is assigned to a certain location, you may transfer it to another location with the inventory-location control function. You can review the availability of inventory at each warehouse location or a range of locations on your screen and print a stock status report for any range of item numbers and warehouse locations.

Other Modules

Macola's other modules—Accounts
Payable, Purchase Order Receiving, and
Bills of Materials Processing—are also
fully integrated with one another. Accounts payable offers the standard vendor

One strength that Macola did not inherit from its minicomputer origins is

security: The system offers only one level of security.

payment vouchering and check-writing functions, including the creation of both recurring vouchers and vouchers from purchase orders interest in the purchase order receiving module. Informative vendor performance statistics are also maintained: the system tracks the number of purchase orders issued to a vendor, total late deliveries are the properties of the properties o

As in accounts receivable customer records, default fields may be specified for each vendor. These defaults include the general ledger account to which invoices are normally distributed, the method of shipment, and the ship-to location. The system will also prepare an aged accounts payable trial balance. Other payables include check reconciliation, cash requirements planning, and manual entry of petty cash expenses.

Macola's purchase order and receiving module allows you to issue and maintain purchase orders for merchandise with a minimum expenditure of effort. The system can also prepare cash requirement projections based upon all the open purchase orders.

This module's receiving functions assist you in matching receipts to their authorizing purchase orders. The first step is the preparation of a scheduled receipts report that lists anticipated receipts by item, vendor, or iob. As merchandise is received, you can record the receipts on-line. The system lets you enter quantities in either the unit of measure used for stocking or in an optional purchasing unit of measure that you defined in the inventory item file. It checks each receipt for overpricing, overshipment, and early receipt, and warns you of any exceptions. Recording the receipts automatically undates the on-hand inventory quantities

and youndrained offers a package called Redisorder from American Information Systems, Inc. Readivarie is both a report writer and an interface to other application packages. Using data from as many as five different Macola data files, you can prepare a report or extract data to be transferred to another productivity application such as spreadsheets, databases, or word processors.

ITEM FILE MAINTENANCE - BASE DATA Microcomputer Distributors 1. ITEM ND TRK-PC 2. DESCRIPTION PC-SYSTEM 256K MONOCHRONE MONITOR 3. PROD CATEGORY MIC 4. USER DEF CODE 5. DEF OR MFG LOC CHICAGO 19. START SALE DATE 04/01/85 6. GTY ON-HAND 25 20. END SALE DATE 04/30/85 7. GTY ALLOCATED 21. SALE PHICE 2, 250.00 8. GTY DN-ONDEN DO PRICE BREAKS APPLY 1 9. DNDER UP TO 23. 00 DISCOUNTS APPLY 1 1D. NEONDER LEVEL 11. AVEHAGE COST 1,750.000 24. USAGE PTD 25. USAGE TTD 12. PRICE 2, 300.00 13. WEIGHT 40.00 26. GTT SOLD PTD ō 14. UNIT OF MEAS 27. OTT SOLD TTD .00 15. PICKING SEQ 28. SALES PTD 16. BACKONDERABLE 2 29. SALES TTD .00 17. TAXABLE 2 30. COST PTD 18. END ITEM CODE 31. COST TTD

Figure 3: Inventory item file maintenance. The first of the four item definition screens contains basic data; the remaining screens asks for detailed management data.

Security
One strong feature that Macola did not inherit from its minicomputer origins is security. The system offers only one level of security. It simply asks you for a password when you leave the main applications menu to enter a specific module. Once you enter the cornect password of no modale, you have access to all of the particular of the particu

A further weakness in Macola's security system appears in the method used to create a new password. If you enter the

ITEN NUMBER TO CHANGE 1

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MACOLA'S ACCOUNTING SOFTWARE

word "change" when prompted for a password, the system will prompt for the current password and then ask for the new one. Thus, any user can change the current password to a module and lock out all other users. This privilege should be restricted to a single individual with a "master" password.

A DOS batch file supplies a back-up facility to back up the files that are associated with each module. These batch files contain the necessary DOS copy commands to properly "archive" each data file related to an individual module. While these batch files will be adequate for some users, they will not help those who have data files larger than a single floppy disk. If the data files you create using any given module grow to the point where they fill more than one floppy, you will have to modify the backup procedures to suit your needs. You can use DOS's BACKUP command or split the batch files supplied with Macola so the data files are copied onto two or more diskettes. If you are not familiar with DOS, a call to Macola will bring help.

Support and Documentation Macola provides technical assistance through a toll-free number. Our calls were handled quickly by the support staff, which seemed knowledgeable and eager to help. We asked several relatively technical questions concerning Macola's interface with our Novell LAN and were impressed when our questions were dealt with swiftly and effectively.

The documentation is organized in a single three-ring binder for each module. Each manual begins with a caution to read the entire manual before beginning to use your new system-an appropriate point to make, though seldom heeded by users. A fully integrated accounting system such as the one offered by Macola incorporates a number of complexities. Only if appropriately implemented can it become an integral and effective part of your business. Without an adequate understanding of how each module functions and interacts with other modules, you will probably not be able to take complete advantage of Macola's features The first few sections of the manual

contain illustration instructions, a review

of terminology used in the manual, and an overview of the functions offered by each module. The remaining sections of the manual discuss each menu choice in detail. Each section begins by discussing the functions that the menu choice provides. This discussion is followed by descriptions of each data entry screen and the data to be entered at each prompt. Finally, sample screens and reports are included to illustrate the use of each function. These descriptions are clearly written and provide excellent detail.

Choosing an accounting system requires a studied comparison of the features it has to offer and an assessment as to whether it will or will not fit your business needs. A review of this nature can provide you with only enough information to determine whether it is worth your while to further consider the purchase of a given product. Macola does offer demonstration sets of each module that include the complete user manual with demonstration programs and data. The demonstration sets perform all the standard functions but will not print reports or allow entry of dates before the year 1998. The \$50 cost of a demonstration set is applied to the purchase of full-function modules.

Macola's functionality approaches that of its minicomputer relatives. Data entry and inquiry performance, even when running multiple workstations on a Novell S-Net system, is comparable to that of a small minicomputer and single-user microcomputer systems. And, although Macola may not match the speed and throughput of its minicomputer relatives when performing complex processing (like generating financial statements), the cost of Macola and the microcomputers on which it runs is substantially less than the cost of a comparable minicomputer system. If you've been considering the implementation of a fully integrated multi-user accounting system and your business activity does not require the power of a minicomputer, Macola is well worth considering .- G. William Dauphinais and Steven M Owens

G. William Dauphinais is an MCS Partner in the Sacramento office of Price Waterhouse; Steven M. Owens is a senior consultant in the Chicago office.

Clear advantage!

This board will expand to 4 Megabytes, 4 serial ports and starts at \$395. That's only part of the story . . .



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row using 256K chips added to a enhanced AT will give you 640K user memory and 384K above the 1 MEG boundary. The memory above 1 MEG can be used by DOS 3.X for VDISK, a virtual ram disk. We think that a 512K board (a first row of 256K chips) is your best buy.

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Like Canon products in other fields, it is well worth considering.

One of the first things you'll notice about the A200 is a size. The physical design follows the more or less standard here-piece arrangement, with separate keyboard, monitor, and system unit. But there piece arrangement years the sequivalent on the IBM. The system unit, are capitaled to the things of the system unit, for example, is, just under 18 inches wide by 15 inches deep, as compared to the IBM's 20-inch with and 16-inch depth. Similar one- and two-inch differences appearance and the system's pleasing, compact look, as well as its slightly smaller footning to work of the significant of the system's pleasing, compact look, as well as its slightly smaller footning to your desix.

One nice extra is the A-200's hardware button—a blessing for those times when the computer hangs up and ignores the Control-Alt-Delete combination. Though placing the button on the front panel sounds dangerous, the button is so well recessed that you won't hit accidentally and wipe out whatever you're working on.

On Top of a Pedestal

The monitor comes on its own pedestal—another welcome design extra. It can swive! 180 degrees or tilt up and down (10 degrees for the monochrome display, 5 degrees for the color). The pedestal will tempt you to put the system unit on a vertical floor stand and place just the keyboard and the monitor on your desk to conserve desk space.

Unfortunately, the A-200's cables for its monitor and keyboard are too short for this kind of setup. Since the monitor cable is not quite 3 feet long, you'll have to invest in a longer one if you want to arrange your system this way. However, the space

Canon Personal Computer A-200

Canon Personal Computer A-200 Canon U.S.A., Inc. One Canon Plaza Lake Success, NY 11042 (516) 488-6700

List Prices: With monochrome card and monitor, \$2,195; with color/graphics card and monitor, \$2,695; 256K RAM optional memory board, \$395 CIRCLE 671 ON READER SERVICE CARD you can reclaim on your desk is probably worth the additional cost.

The other obvious choice for setting up the system is the conventional approach, with the monitor on top of the system unit and the keyboard directly in front. The tilt feature lets you find a comfortable viewing angle with any reasonable arrangement.

Monitor

The good news about the monitor doesn't stop with the pedestal. The resolution on the color monitor screen, which Canon sent for PC Magazine's review, is 640 by 200 pixels for text and 320 by 200 pixels for graphics. The numbers say that this matches the resolution on the IBM PC,

but the visual impression is very different. Whether using graphics or text, color appear crisper and brighter on the Canon monitor than on the IBM FC color monitor. Text characters are also more read-background matrix on this screen, which seems darker than that on the IBM FC. Another factor may be that the screen is not feel from the factor way be that the screen is difference in call, cannot use the IBM FC color display for text for extonded periods of the Canon A 2019 of South and Canon A 2019 of South

Keyboard

improvements. It follows a strictly IBM PC layout, right down to the lack of status lights on the NumLock and CapsLock status, which executed the status back—not even the mushy feel of Key-burdies back—not even the mushy feel of Key-turnic keyboards. If you're heavy-handedwhen when typing, you can easily type in extra-neous characters unaware. On the plus side, the keyboard is quiet.

Alas, the keyboard sports no equivalent

You can type while you're talking on the phone without the other person's hearing the keystnokes. Even better, the keyboard is plug-compatible with the IBM PC. If you prefer the feel of the IBM PC keyboard or the layout of a Keytronic or Obstern the control of the IBM PC they have the control of the IBM PC they have the control of the IBM PC they have the prefer to the IBM PC they have the control to the IBM PC they have the will be the IBM PC they have the well as the Canon keyboard and had no trouble with either.

Storage capacity for the A-200 is cur-

rently limited to either one half-height or two half-height 51/r-inch drives. These use the 360K IBM PC format. Canon's hard disks for the machine are not yet available, but the A-200 can use any third-party hard

disks that will work with the IBM PC. Inside the box, the A-200 has an 8086 CPU; the 256K RAM on the system board is standard. There is also room for an optional 8087 math coprocessor. Other goodles on the system board include one RS-232 serial port, one Centronics-compatible purallel printer port, and the disk controller electronics—all standard. The ROM includes the usual BOOT and BIOS routines. No on-board BASIC is supplied.

The documentation, by the way, is nothing special: It includes the standard MS-DOS manual, plus a manual for installation. However, setting up the machine is easy. Just plug the cables into the matching plues, and the A-200 works.

Room to Grow

The A-200 has a total of five expansion stosts, but with so many features stand on the system board, you're not likely to need many of them. In a typical setup. 1256K RAM, two disk drives, one serial port for a modern, and one parallel port for a printer, the system uses only one slot—for the monitor board. That leaves, and one parallel ports a printer, the system uses only one slot—for the monitor board. That leaves post, and the post slot port slots for memory expansion, additional serial and parallel ports, internal modern hand disk controllers, or anything else you can think of.

According to Canon, all five slots are BIM PC compatible and should work with virtually any expansion board designed for the PC. There of these five are strickly for compatible, right down to using an 8-bit data bus. The other two slots, however, have been modified to take advantage of the 16-bit data bus of Canon's 8086 to Ton Canon's 8086 to 10-bit and the side of the Canon constraints of the Canon Selfs RAM expansion board, the Canon monochrome board, and the Canon cotorigrathics board, and

Two slots for the three 16-bit boards obviously means you cannot have all three in one machine. On many computers, this situation would pose a potential problem: You might want the extra memory with both the monochrome capability for word processing and the color capability for other applications. As mentioned, however, the readability of text on the Canon color screen is so much better than on the IBM PC color screen that even the most demanding users probably won't need the monochrome board for word processing. A more troublesome limitation here is

the maximum RAM expansion to 512K. Not long ago 512K RAM sounded like more memory than anyone could ever reasonably want to use, but the trend today is toward the so-called power user. Minimum RAM requirements for many programs are now in the 256K to 320K range. Combine that with the upcoming genera-

> A-200 IBM PC

1:04.7 1.25 9

RAM Processor Tasks

Test #1

SuperCalc

tion of multitasking operating environments, and the maximum of 512K RAM begins to sound limiting.

One other possible worry: Because of the relatively small size of the system unit. filling in all five expansion slots would leave little air snace or room for circulation. Canon says it has tried loading the A-200 this way and have had no problem with overheating. If you're planning to fill up all the system slots, however, it might pay to exercise some caution. Of course, the real question for any

computer system is, How well does it work? The best indication of that is usually speed, stated as a measure of how long a job takes. Given the reputation of the 8086 CPU, you would probably expect the A-200 to be significantly faster than the IBM PC in most tasks. You would be only partly right.

The 8086 CPU does have an advantage over the IBM PC's 8088. This is particularly true in machines like the AT&T 6300, where the clock speed of the system is 8 megahertz. But Canon has chosen to run its 8086 at 4.77 megahertz-the same speed as that of the IBM PC. This still gives the A-200 a speed advantage in some cases, but not nearly as much as you might hope for.

Benchmark Tests The speed advantage shows most clearly in tasks that the system handles entirely in RAM (see Figure 1). A spreadsheet recalculation in SuperCalc 3, for example, took 64.7 seconds on the A-200 as compared to 85.8 seconds on the IBM PC, for a time savings of nearly 25 percent on the A-200. Similar results show up in loading WordStar from a RAMdisk and in timing a program that calculates prime numbers. What the IBM PC did in 1.4 seconds, the A-200 was able to do in 1: what the PC did in 35 seconds, the A-200 did in 25. In both cases, the savings in time was better than 28 percent.

Unfortunately, the speed advantage disappears with other kinds of tasks. Formatting a disk on the A-200, for example, takes 71.7 seconds from the start of formatting to the time when the disk drive stops spinning. The same task on the IBM PC takes 70.7 seconds, so that the A-200 actually takes a second longer.

Even more interesting, loading Word-Star from disk rather than RAM also takes more time on the A-200: 4.1 seconds as opposed to 3.6 seconds on the IBM PC.

The obvious culprit here is disk access time. A read/write test that measures just disk access bears this out. In every test of writing to disk or reading sequential records from disk, the A-200 was significantly slower than the IBM PC. A sequential read that took 38.7 seconds on the IBM PC, for example, took 44.0 seconds on the A-200. And one write test that took 62.4 seconds on the PC took a whopping 91.8 seconds on the A-200.

So the presumed speed advantage of the 8086 may not materialize in practice. This was particularly evident in a timed test moving through a 30-page, single-spaced WordStar file, which involves both processor speed and disk access. The A-200 made it through the file in 1 minute, 19.4 seconds. On the same file, the IBM PC took 1 minute, 20.0 seconds.

To be blunt, the A-200 is no speed demon. At best, the system is no slower than the PC, and depending on the application, it may be noticeably faster.

Compatibility

Another important issue for any machine that claims PC-compatibility is the question of compatibility itself. Here the A-200 does very well.

As was mentioned, the A-200 hardware is highly compatible with equipment designed for the IBM PC. It is plug-compatible with the IBM PC keyboard and with virtually all expansion cards designed for that machine. What's more, the color and the monochrome monitor are both plugcompatible with their IBM PC counterparts. Alas, Canon doesn't sell its monitors separately from the A-200.

More important for most purposes is compatibility with software, beginning with the operating system. The A-200 comes with MS-DOS Version 2.11 and with GW-BASIC. The system will also boot with PC DOS 2.1 and PC DOS 3.0 and appears to work without a hitch. In particular, the A-200 can use the PC DOS 3.0 file VDISK.SYS to create a RAMdisk. (VDISK.SYS was used for the RAMdisk speed test mentioned earlier.)

PC Magazine's software tests included

recalculation Test #2 Loading WordStar 0:01.0 0:01.4 Test #3 Prime number calculation 0:25.0 0:35.0 **DISK Tasks** Test #4 Formatting a disk 1:10.7 Test #5 Loading WordStar program (drive tested 360K 51/4-inch (loppy) 0:04.1 0:03.6 Test #6 Read/write to disk (drive tested: 360K 51/4-inch floppy) Record size 128 byte Random read 0:44.0 0:45.7 0:14.2 0-9 3 Sequential read 1:31.8 1:02.4 Write 300 byte Random read 1:22.6 1-26.2 Sequential read 0.20.8 0:16.0 0:53.7 Write 0:43.3 512 byte 0.52.0 0.58.5 Random read Sequential read 0:44.0 0.38.7 1:10.2 1-02 0 578 byte

1:50.8

0:51.3 0:46.1

1-10-4 1:03 1

1:19.4 1:20.0

1:55.8

Figure 1: Benchmark lests comparing the Canon A-200 to the IBM PC. The times are given in minutes, to the nearest tenth of a

Random read

Test #7

Sequential read Write

Moving front to back

through WordStar file

(drive tested: 360K

51/4-inch floppy)

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CANON A-200

about a half-dozen programs that cause problems on other PC-compatibles. These are MicroSoft Word, Word Perfect (the IBM version), Flight Simulator, Lotus's 1-2-3 graphics, and a Pac Man clone called PC Man. All worked perfectly.

The only problem the A-200 had with any tested software was with the ProKey program LAYOUT.COM. ProKey is primarily a macro creation program. It lets you define any key on your keyboard so that you can "type" boilerplate text or commonly used commands with a single keystroke. LAYOUT.COM is a related program that comes with ProKey. With this program, you redefine the layout of the keys so that you can, for example, exchange the control key with the CapsLock key. But LAYOUT.COM displays a screen message saying that it can't run on the A-200. ProKey itself, however, runs without a problem.

Other programs that PC Magazine ran on the A-200 without encountering any problems are WordStar, SuperCalc 3. and Crosstalk XVI. And Canon verifies that its list of over 400 programs works fine. According to the company, the only programs that don't work are "a few obscure games." The emphasis is on obscure: their list of tested programs covers about 70 game programs, including Decathlon, Frogger, and Jumpman.

By any measure of compatibility, the A-200, like Ivory soap, is 99 41/100 percent pure. You may be able to find some programs that won't run on this system, but you'll have to search for them.

Overall, the Canon A-200 is an attractive machine. The improvements it makes to the IBM PC standard are modest, but nonetheless real. The added readability of the color screen is alone enough to make the system worth a close look. In addition, the A-200 has a list price approximately \$500 less than a similarly configured PC with monochrome or color monitor. The A-200 is no match for the PC AT in terms of speed or storage, or even for the faster 8086 machines like the AT&T 6300. But if you're looking for a machine in the same class as the PC, the Canon A-200 belongs in the running.

PC

M. David Stone is a frequent contributor to PC Magazine.

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First, we buy the best drives available. Sounds trite, doesn't it? I mean, a drive's a driveright? Hardly. You should see some of the junk we get in our labs. Some have such high failure rates that we even questioned our own \$10,000 hard disk tester. But when we tested other manufacturers' drives we were assured that our equipment was fine, which just confirmed that the bad hard disks were not only

bad-they were real bad. But that's just the weeding out process. We then take each drive that we've put through our tester and test it again with the controller you've requested. We call this a "tested pair."

DOS Doesn't Do It In case you're thinking that all tion of what DOS does for you, let me explain the disk facts of

If DOS did what you may think it is supposed to do when you format the disk, DOS would map around these had areas. Unfortunately, DOS doesn't do

DOS 2.0 and 2.1 can't enter the bad tracks. DOS 3.0 can, but only on the IBM AT. Unfortunately, as the press has so well documentated, the AT's hard disk develops had tracks later

We do what DOS can't We believe the problem is so had, we use a software program that performs a powerful test of your disk drive on all of the IBM or IBM compatible computers-PCs, XTs, and ATs. Our format takes hours to analyze the disk But when we finish, you know that the bad tracks are really mapped out so you won't write good data that will disappear into a black hole. We even send you a printed statement of our test results

Our software allows you to type in the bad track locations from the list supplied by the manufacturers, so you'll never

write good data to them-even if DOS didn't identify them as bad. The software even lets you save the location of these bad sections to a file, so that you can reformat your disk without spending hours retesting.

We even include a program that will give you continuous comments on the status of your hard disk. No more waiting for that catastrophic failure

Average Access Time As you might suspect, some hard disks are faster than others in

their ability to move from one track of data to another. The time it takes the hard disk to move one-half way between the beginning of the disk to the end is called the "average access The first generation of 10 meg-

abyte hard disks had average access times of 80-85 milliseconds (msec). But computer users love speed, and guess what—the average access time for the new 20 megabyte hard disk in the IBM AT is only 40 msec. (We sell an AT equivalent with only 30 msec access time!)

There are some legitimate reasons for the shorter access time It's particularly helpful when there are multiple users on the same hard disk. It's also important when running a compiler. But remember, before you get too wrapped up in the access speed, there's always that ST 506 nterface which won't let data transfer from the hard disk to the computer any faster than 5 me-gabits/second. We've bypassed that choke hole, too. If you want the functional equivalent of a Ferrari with a turbocharger, order our 10 Mbit per second 108 megabyte hard disk with 18 msec of average access speed.

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iron oxide and plated mediathe stuff that covers the hard disk and gives it its magnetic properties. Iron oxide is .- well. it's rust. If you inadvertently joust your disk, you may cause the low flying head to dig out some iron oxide. A little rust flake can ruin your whole day. Plated media is more resistant to damage, and if it happens, less data is lost

We offer both types of hard disks. The iron oxide is older









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-	21	Full	no	30 msec	5 Mbus/s	\$ 1,535	\$ 1,34
	32	1/5	ves	85 msec	5 Mhits/s	\$ 1.095	\$ 89
	32	Full	no	30 msec	5 Mbits/s	\$ 1,775	\$ 1,57
٠.	65	Full	no	30 msec	5 Mhits/s	\$ 2,295	\$ 2,07
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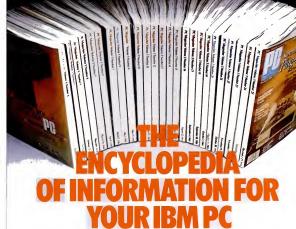
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Model 100 LIVES ON WITH

Add-ons

A creative aftermarket for products such as spreadsheets, file transfer programs, disk drives, and add-in memory boards recharges the Tandy portable's already considerable appeal.

C Magazine has long regarded the Trady/Radio Shack Model 100 as one of the hand-control of the Cacessories anyone could have. More than a period of the Cacessories anyone could have. More than a period of the Cacessories and the Cacessories of the Cacessories

The Model 100's weight—under alponds—and sweatility make it made ratractive than many of the PC-compatible portables that are currently being metated, and '1've fried themail. Even advanced machines such as the Date Gereatily to merit consideration for the properties of the prosideration for which we want just post merit consideration for which we want just post prosideration for which we want just play the using a DCVI on a plane. It's a kick by the recentive showing off in first class, but the real work is getting done back in coach on a Model 100.

The Model 100's popularity has spawned a small but creative aftermarket. Here's a look at some of the best new goodies for the Model 100.

Spreadsheets to Go

While the 100 gives me all the word processing and telecommunications capabilities I need when I'm on the road, I've bemonated the lack of a spreadsheet on more than one occasion. Of course, the new Model 200 has Multiplam and twice the screen size, but I still prefer the fatness and lighter weight of the 100. Now there are two choices in Model 100 spreads the 100 september 100

The first is Microsoft's Multiplan, nearly identical to the version on the Medel 200. Though it suffers from long-standing Multiplan limitations, such as the inability to size columns independently and clumsy row and column designators. (RxCy), its reasonably quick, easy to use, and has good "money" features such as net present value. It lets you name cells and ranges—a powerful feature for such a small package—and retains the handy



From left to right: Tandy's Multiplan ROM is sober black, while the RAM+ ROM sports a jaunty silver ribbon for easy removal. The adapter for the Chipmunk disk drive plugs in easily. IDEA's cassette tape typifies the way most software is distributed for the Model 100.

lookup function its big siblings have. Moreover, the screen scrolls quickly in response to your cursor commands.

Spenies to your cursor commands.

Muliplant's documentation for the 100 contains the same tutorial (the ceramiss shop) that we've come to know and love. It's leaner than the CPM and MS-DOS manuals, but in keeping with the scaled-back nature of the program. One of its best features is that you can output files in Microsoft's familiar SYLK format for use by other programs.

One of the most prolific supporters of the Model 100 aftermarket is a company called Personal Computer Support Group (PCSG) of Dallas, Texas. PCSG claims that its spreadsheet, Lucid, is "exceptional." And so it is. It recalculates with amazing speed, uses 1-2-3-like cell references, "feels" like the Model 100 text editor, and has 14 digits of precision. Lucid is especially rich in output commands. It can print to any Model 100 port, making uploading of data to your PC a snap. That's fine for moving cell data from one machine to another, but you can't export the formulas. A program that communicates with 1-2-3 spreadsheets is currently in the works. You can, however, size columns individually, and there are many useful display format options.

For all its speed, Lucid is slow in scrolling. Part of the slowness is attributable to

Lucid's use of reverse video for the row and column bars. It takes longer to turn on all those pixels, and the 100 is no great shakes at driving its screen, anyway. It's actually faster and easier to use Lucid's

In addition to disk management, the Chipmunk Portable Disk Drive extends BASIC's repertoire of commands and functions to handle disk operations, including PClike random access instructions.

GOTO command to get to cells that are not on the screen.

The manual is endlessly boastful and continually reminds you just how great Lu-cid is. It even includes results from some performance tests against products running on desktop machines. The writing could use some professional polish, but it gets the message across. That aside, Lucid is a very sophisticated program. It uses sparse matrix management, which means that only the cells that have something in

them use memory. Even 1-2-3 isn't able to do that. It improves on Multiplan's Table command by not only providing z-y lookup, but actually executing procedures and prompting the screen from tables. You can even refer to formulas in spreadsheet files other than the one you are actively working on. At \$149.95, Lucid is the class act in Model 103 spreadsheets.

File Transfer

Another product from PCSG is Disk+, a file transfer program that works in coniunction with virtually all desktop personal computers. It lets you use your desktop machine as a disk drive for the Model 100. It simplifies the actual file transfer to the no-brain level-iust move the cursor to the desired file and press the Enter key. The best part of Disk+ is that it is completely bidirectional. It comes equipped with a program that runs on your desktop machine and delivers the same capabilities on both ends of the RS-232 cable, so you can send files both ways. Better still, you can send all the files on the Model 100 over as a "subdirectory," clear the machine, then restore them at a later date. This form of context switching is ideal for going on a business trip with a clean slate, then unloading the machine and picking up where you left off when you return. Unfortunately, as a plug-in ROM, Disk+ is somewhat

steeply priced at \$149.95.

Another handy program for the Model 100 is Kensington Microware's Remote Control. Specifically written for the IBM PC, Remote Control comes with an RS-232 adapter cable to get the two machines talking to each other. It simulates a Model 100 on the PC, including the text editor and Telcom. Uploading and downloading programs is as easy as using Telcom between two Model 100s. You can send groups of files back and forth, see a disk directory on the PC's screen, and more. The editor is a superset of the Model 100 editor, but the basic keystrokes all do the same thing.

Diminutive Disk

Holmes Engineering has made disk drives for the Model 100 almost from the beginning-now marketed by PCSG, Holmes's product predated Radio Shack's drive by nearly a year. After experimenting with various sizes and components, Ray Holmes came up with the Chipmunk for the 100 and the 200, and it's hard to imagine a more perfect drive: It uses the Sony 31/2-inch hard-shelled diskette, just right for portability. The drive weighs just a shade over 3 pounds and runs an internal, rechargeable battery. If its cable were longer, the Chinmunk could hide away in your briefcase while you use the computer on your lap. I could wish for even more compactness and miniaturization, but the Chipmunk is a remarkable achievement for what is clearly not a volume market.

The only thing better than carrying this little drive is using it. You pop in the adapter board, clip on the cable, and press the reset button on the back of the Model 100. Next thing you know, CDOS (Chipmunk Disk Operating System) appears on your screen. It replaces the Model 100 menu with one that displays files the same way, but includes function keys that manage files and transfer them to and from the disk. It even time- and date-stamps your files.

CDOS lives on a ROM inside the Chipmunk drive. In addition to disk management, it also extends BASIC's repertoire of commands and functions to handle disk operations, including PC-like random access instructions.

While most people will use the Chip-

munk for straightforward file storage, its performance is quite accceptable for random access and sequential read/write duties as well. The Chinmunk writes 200 sequential records of 255 bytes back in 82 seconds. The same number of records written as a random file took 5 seconds longer. A PC using BASICA does the same sequential write in 41 seconds, but the random write takes only 21 seconds. Given that the Model 100's clock speed is half that of the PC, the performance is respectable.

At \$599, the Chipmunk isn't cheap, but it opens up a whole new world of portable computing.

Footloose Software

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Traveling Software is another company formed specifically to serve the briefcase market. The company's range of titles encompasses time managers, expense re-

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Portable Computer Support Group 11035 Harry Hines Blvd., #207 Dallas, TX 75229 (214) 351-0564 List Price: \$149.95 CIRCLE 697 ON READER SERVICE CARD corders, database programs, file management utilities-the works.

One of Traveling Software's newest products is an idea or outline processor. An outline processor for the Model 100? Why not-everyone else has one. It's called, economically, IDEA!. Like most other aftermarket software for the 100, it loads from cassette tape. It links idea or topic headings with subordinate notes, then moves the notes around as you move topics. As with PC-based outline processors, you can expand or compress your thoughts; the program alternately displays and suppresses the notes under a given topic. If you've used any of the outline processors on the PC, IDEA! will be a natural for you.

board. This little add-in board is manufac-

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TRS MODEL 100

tured by Cryptronics and marketed by PCSG. It packs an additional 64K of battery backed-up RAM for the 100, for a total of 96K. Like the Model 200's memory. it's organized into three banks but does the 200 Version one better by offering 32K per bank instead of 24K. A tiny program, a mere 8 bytes long, switches you from bank to bank.

If you like, you can use the RAM+ ROM cartridge that accompanies the board, which gives you a nice repertoire of file and memory management utilities. You can use any of the spreadsheet or other expansion ROMs, or even the Chipmunk drive, while the 64K board is plugged in. The board and program together cost \$425, so you've got to be serious about your Model 100 to get the package. But the board weighs nothing and gives you a significant percentage of the disk drive's convenience, with none of the encumbrances. It runs a close second to Lucid as my favorite add-on.

Rolling Your Own

Don't forget the Model 100's very canable version of Microsoft BASIC, Everyone I know who uses a 100 extensively has delved into BASIC in order to whin up a quick word-counting program, a print formatter, a sort utility, or the like. People also use their 100s to time autocrosses, score vacht races, handican horses, and pick stocks. The Model 100 Special Interest Group on CompuServe is still one of the best places to get free programs and upto-date information on the latest products and techniques. You'll find a wealth of information on unusual and interesting applications, too.

Even after 2 years, my Model 100 still raises eyebrows and draws attention. The continually eroding price has made it the \$599 cure for loneliness. It's sometimes difficult to get work done for all the questions people ask. These add-on products have made the machine just about ideal. All I miss is a larger screen. Even at home, with a Compaq Plus on the desk, I often use the 100 for writing and electronic mail. The quiet clacking of its keyboard is a whole lot less obtrusive than the keening wail of the Compaq's cooling fan. At work I use the PC AT: after all, I've got an image to maintain

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PCs Set Sail



With a lot of perseverance and a little help from some microcomputers, the America II challenge group hopes to bring the America's Cup back home

ile the rest of us were dealing with this past winter's deep freeze, a hardy band of Americans, the America II challenge syndicate, were searching for ways

to make a sailboat go faster in the waters of the Indian Ocean. In February of 1987, the Royal Perth Yacht Club in Australia will host the competition for the America's Cup, yachting's most prestigious prize. This is the first time the contest has been held outside the United States since the races started in 1870, and the America II challenge syndicate intends to bring the

Cup back (see sidebar, "The America's Cup Tradition"). It has jumped out ahead of the pack in its preparations, and personal computers are making valuable contributions to its ongoing efforts.

As with the majority of yacht designers, the syndicate is relying heavily on mainframe and minicomputers for the boat designs; however, microcomputers are play-

ing an essential role as well. One of the important differences about the 1987 races is the fact that they will be held in the windy waters of the Indian Ocean off of the western coast of Australia.

These conditions are in sharp contrast to the relatively gentle breezes found at the competition's traditional Newport, Rhode Island, location. In order to get a jump on the competition, the America II group built a brand-new test boat and took it to Perth to test the conditions. They sailed through the Australian summers of 1984 and 1985 (which were our winters here up north),

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AMERICA'S CUP

gathering data about their boat and the weather conditions.

XT Help

Bringing all the necessary equipment into Australia was not without a certain amount of complication, however, and a mount of complication, however, and a mount of complication of the post in the po

government simply asked them to post a bond and provide records accounting for every item brought in and its final disposition.

tion. The solution to this large recordkeeping problem was provided by Gene Story and Don Logan of Marine Management Systems (MMS) of Stanford, Connecticut. Their company produces software for the Their company produces software for the treft applications as fleet payroll, cargo management, and scheduled ship mainsanance. The package that really came to the recuce of the America II, however, was MMS's ship inventory program, which keeps track of the Goation of every one of the ship's items and can even break items down in terms of their component parts. It

The America's Cup Tradition

The 1983 defeat at the hands of the Australians means that the American team must get serious if it wants to bring the Cup back home in 1987.

In the past, the America's Cup compe-tition has been a time of parties for all involved. Let's face it-Newport, Rhode Island, in the summer is hardly the setting for a professional training camp. But this attitude, which puts recreation over competition, has started to change. The 1983 Australian crew invested long hours in physical training and in developing a disciplined approach to their challenge preparations. One person involved in the upcoming 1987 challenge felt that the Americans lost the Cup in 1983 through overconfidence, complacency, and the fact that the Australians were technically superior. An observer of the 1983 races found the competition to be "as much finance and management as it is sport." By adopting the serious attitude of the 1983 Australian team and adding a bit of computer technology, the America II challenge group intends to restore the Cup's proud and distinctly American tradition.

The original Cup was won in Britain in 1851 by the schooner America, which was built by a consortium of businessmen who intended to take her to England

and make a killing on wagers with British yacht owners. As it turned out, she so outmatched the competition, no one would race her after she won the Hunded Guinea Trophy in a race around the lale of Wight. The Royal Yacht Square on gave her sponsor, the New Yacht Club, the trophy as a "perpetual Challenge Cup for friendly competition between foreign countries." Thus, the America's Cup was born.

Tradition of Dignity and Dollars

That first victory led to one of the longest-tunning and most expensive contests in modern sports. The New York Yearh Club hosted and retained the Cup While the boats have changed in design and size over the decades, the America's Cup competition continues to be a costly undertaking for challengers and defenders alike. Today's boat syndicases have buggest in the stem of millions of dollars, because the control of the contr

which is national pride.—Alfred Poor



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can report parts usage, give a warning when the number of items falls below reorder quantity, and even help generate purchase orders. Another helpful feature is that it lets you record the location of each

part by storage compartment and then by bin within each compartment.

Arthur Wullschleger, the America II operations manager, loaded up all his shipping containers here in the U.S. and creat-

ed extensive records the contents of each storage cabinet using the MMS software and an IBM PC-XT with an Epson MX-100 printer. When he arrived in Perth, he



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CIRCLE 113 ON READER SERVICE CARD

The package that came to the rescue for America II was MMS's ship inventory program, which keeps track of the location of every one

of the ship's items and can break items down in terms of component parts.

was able to hand the customs officials a

was able to hand the customs officials a large printout detailing every item brought in by the syndicate. He brought along the XT so that he could maintain accurate records while in Perth.

Alternating Currents

However, using the XT in Australia presented new problems. The electricity is different there—240 volts at 50 cycles and needed to be converted to the 110 volts at 60 cycles that we use here. Wullschleger didn't want a gas-powered generator that needed to be fueled regularly, so he asked



The 1967 America's Cup race will be held in the windy waters of the Indian Ocean.

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Westinghouse to design a generator that could be powered by Australian electricity. Westinghouse came up with a large hunk of machinery the size of a truck engine that did the trick. As a result, the

America II compound has both Australian and American power outlets in its workshops.

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smoothly, the group is going to add fund accounting software to handle the financial aspects of its operations. It is also looking into the possibility of using project management software as a means to help cope with the awesome task of moving a major operation to the other side of the world and back. And the main office in Newport will soon be getting and XT for word protesting and list management tasks in support of the sworldcare's fundamine efforts.

Micro Firstmates

There is more computing power at the disposal of the America II team in Australia. Chris Bouzaid, president of Hood Salis, is working as the director of sail development. His constant companion is a Hewlett-Packard 110 lap portable. He takes it with him out on the boat during trials and takes down the data concerning which sails were used and how well they

The America II syndicate is going to add fund accounting software to handle the financial aspects of its operation and is looking at the possibility

of using project management software.

performed under various conditions. He loads these statistics into Louis's 1-2-3, which is built into the machine's ROM, and performs his analysis. As he puts it, "by the time I come in from observing a day of sailing, I have a full report prepared on what took place." He also uses the graphing features of 1-2-3 to help him to visually analyse the results.

visibility analyze for evisions. Such careful analysis is especially important with a complicated ricing boat interchangeable parts that permit rapid attacks and a complex parts that permit rapid attacks, unders, and even deck layout. Almost overnight, the boat can be pulled from the water, reconfigured to create essentially a new boat, and put back in the water for further testine. With all the

possible variations, it becomes essential



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that performance data be carefully recorded. The results will be used in the design of a second and possibly a third boat, all to be built by the America II syndicate in preparation for the 1987 races.

In addition to the XT and the HP 110. other micros have been pressed into service at the America II compound in Perth. A pair of Waverider bouys send wave data by radio to a receiver, which in turn passes the data on to an HP 85 that performs a Fourier analysis and prints statistics on the size and frequency of the ocean waves. Another piece of equipment monitors wind speed and records the data on magnetic tape for later analysis. Even the America II has a micro on board; an Epson lap portable has been wired to the electronic instrumentation to record and analyze the boat's performance. Back on shore, team member Olin Stephens uses an HP 9816 (with a full megabyte of memory) to T



The America II has a micro on board to record and analyze the boat's performance.

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In addition to being compatible with all kinds of computers, WordMARC also gets along with all kinds of users.

Its documentation is written specifically for the computer system it will



model boat performance under different conditions. Stephens, who describes himself as "a retired yacht designer," remains active on the America II team. Since he helped design many of the most successful America's Cup racers in the past, his participation may provide an important edge in the competition.

While Bozzaid's HPI10 was domated, the Americal II syndicate had to purchase the XT out of its own funds. Jane Kent, excise physiologis in charge of developing the training program for the Americal II when the was working with the Obrupic Yachting Committee Sports Medicine Program during the preparation for last summer's Olympics. After seeing Christ working with the Characteristic Sports of the Sports of

Aussie Ingenuity

Meanwhile, the Australian defenders evidently have no shortage of computer assistance. One of their corporate sponsors is

The Australian defenders have no shortage of

computer assistance. One of their sponsors is Data General Australia, which has supplied minis and micros

Data General Australia, which reportedly has supplied a whole complex of minis and micros to aid the defenders' cause. It remains to be seen whether or not American computer companies will follow the example set by their Aussie counterparts and

lend their support to the U.S. effort in this highly technical competition.

Bringing Back the Cup

The America II syndicate is mounting a well-managed, disciplined, and organized challenge for the America's Cup, as evidenced by its base of operations in Australia, its professional training program, and its early start. Certainly this attitude will make the America II a worthy competitor, and with the help of the microcomputers, it will be technologically competitive as well as the competitive as a consense approach of the America II team may well bring the Cup back to our shores in 1987.

Alfred Poor is president of SoftIndustries, a microcomputer consulting firm in Woodbury, Connecticut. He is a frequent contributor to PC Magazine.

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Keeper of Lost Commands

Rekeving long command lines is a chore and a half. Here's a handy utility that gives you an instant replay of the last ten you typed.

ost PC users know that they can repeat the last command they entered simply by pressing the F3 key and hitting a carriage return. Handy as this trick is, however, it would be even nicer to temporarily store and re-execute more than that one last command. If you're in the middle of an elaborate chain of commands to DOS, such as

CD\LOW\LOWER\LOWEST

DIPLOTHE "BAS" | SOPTOMYTTIES

you're almost sure to find that you're logged onto the wrong disk drive. In such cases, your easy, one-step F3 memory gets used when you have to enter the correct drive letter, and you're stuck with retyping that whole long command once again. And it seems that the longer your command strings become, the more likely you are to recall ruefully that you just typed the same command line only four steps ago.

The program described in this article can save you such rekeving chores. Using KEEPER.COM, you automatically retain the last ten DOS commands you have issued, for instant re-execution. When you want to re-use one, you type a trigger key, and a window listing these commands flashes onto the screen in bold reverse video. If none of the command lines shown is what you want, you just type the same trigger key and the window will disappear. On the other hand, if you spot a command you want, you merely use the up or down cursor keys to select that line, which will begin to blink. When you hit the trigger key at this point, the window turns off the

1985/No. 15



command you chose will be entered exactly as if you typed it, and the carriage return to execute it will be supplied. Opening and closing the window will not disturb the screen contents beneath it. Scrolling up and down the command window and selecting a blinking command makes the process almost fun. And using the same key to turn the window on and off, as well as to enter and execute the selected line. economizes keystrokes.

Keeper Particulars

Keeper stores command lines up to 50 characters in length, enough to type

COPY A: MAMMOTH, BAS B: MASTODON, BAS

with plenty of room to spare. This means, though, that Keeper will also read what you type to your programs, not just DOS comtrunds. Keeper has no idea whether your

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CALL

CALL

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CALL

CALL

commands are intended for DOS or for an application program. However, in actual use, you will find that this is not really a problem at all. Keeper watches the keys struck and accumulates them until there is a carriage return. It will also automatically

Keeper knows when the buffer is full, can | teractive Reader Service at (212) 696read type-ahead characters, and also watches for deleted characters, just as DOS does

If you have a modem, the relevant .ASM, .BAS, and .COM files for Keeper | in PC itself. If you wish to have a copy of

0360. As an alternative, you can type in the rather lengthy BASIC listing shown in Figure 1 and run it. (Because of space restrictions, we cannot print KEEPER. ASM supress blank lines (as the F3 key will not). can be downloaded directly from PC's In- this file, you can get it either by modem or

```
SUM#=0:PRINT"Checking Data..."
 10
 20
     FOR I=1 TO 1108:READ BYTE.%:SUMS=SUMS+BYTE.%:NEXT I
 30
      IF SUM# <> 862031 THEN PRINT"Error in Data Statements":GOTO 180
     RESTORE: FOR I=1 TO 10: KEY I, "": NEXT I:CLS
 40
 50
     LOCATE 18,18:PRINT"Type the trigger key for the screen window."
     GOSUB 190
 68
 78
     KEYS(1) = CODE1:KEYS(2) = CODE2:CLS
 80
     OPEN "KEEPER.COM"
                             AS 0 1 LEN = 1
                                                        'Open Keeper.Com
 98
     LOCATE 5,38:PRINT"Creating Keeper.Com
100
     FIELD #1,1 AS BYTE.$:FOR N = 1 TO 1108
110
     READ BYTE.%:IF BYTE.% <> -1 THEN GOTO 130
120
     FOR JJJ=1 TO 2040:LSET BYTE. $=CHR$(0):PUT $1:NEXT JJJ:GOTO 160
130
     IF BYTE.% <> -2 THEN GOTO 150
140
     LSET BYTE. $=CHR$(CODE1); PUT #1:LSET BYTE. $=CHR$(CODE2): PUT #1:GOTO 160
150
     LSET BYTE.$ = CHR$(BYTE.%):PUT #1
     NEXT N:CLOSE #1
160
179
     LOCATE 5,38:PRINT "Keeper.Com Created.
180
     END
190
     DEF SEG = &H40
288
     FKEY$=INKEY$:IF FKEY$="" GOTO 200
218
     LOCATE 18,15:PRINT SPC(58):LOCATE 11,15:PRINT SPC(58)
228
     TAIL=PEEK(26):TAIL=TAIL-2:IF TAIL < 30 THEN TAIL = 60
230
     CODE1=PEEK (TAIL):CODE2=PEEK (TAIL+1)
240
     RETURN
     DATA
            233,
                   226,
                          11,
                                 40,
                                        67,
                                              41,
                                                     49,
                                                            57,
                                                                   56,
                                                                         53
260
     DATA
             32,
                    83,
                          46,
                                 72,
                                        79,
                                              76,
                                                     90,
                                                            78,
                                                                   69,
                                                                         82
278
     DATA
             -1,
                   150,
                            à,
                                112,
                                       240,
                                                      0,
                                                             ø,
                                                                    ø,
280
     DATA
              ø,
                                  9,
                                         0.
                                                ø,
                                                      ø,
                                                                    ø,
                                                                           ø
298
     DATA
              ø,
                     0,
                            ø,
                                  ø,
                                         ø,
                                                      ı,
                                                             ø,
                                                                    1,
                                                                           a
300
     DATA
              ø,
                     ø,
                            ø,
                                  ø,
                                        80,
                                               83,
                                                     81,
                                                            82,
                                                                  87,
                                                                         86
310
     DATA
             30,
                     6,
                         156,
                                 46,
                                       255,
                                              30,
                                                     32,
                                                             9,
                                                                  187,
                                                                         64
320
     DATA
              ø,
                   142,
                          219,
                                139,
                                        30,
                                              28,
                                                      ø,
                                                            59,
                                                                  30,
                                                                         26
330
     DATA
              ø,
                   116.
                          73.
                                139,
                                        22,
                                              26,
                                                      ø,
                                                           131,
                                                                 234.
                                                                           2
349
     DATA
            131,
                   250,
                          30,
                                115,
                                         6,
                                              186,
                                                     62,
                                                             ø,
                                                                 131,
                                                                        234
350
     DATA
              2,
                    59,
                          22,
                                 28,
                                         ø,
                                                     17,
                                                            46,
                                                                 128,
                                                                         62
360
     DATA
             23,
                     9,
                                116,
                                        41,
                                               46,
                                                    198,
                                                                   23.
37 Ø
     DATA
              1.
                   235.
                                144,
                                        46.
                                                      6,
                                                            23,
                                                                           a
                                              198.
380
     DATA
             46,
                   131,
                          62,
                                 21,
                                         9,
                                               0,
                                                    117,
                                                            30,
                                                                   46,
                                                                        139
300
     DATA
             22,
                    43,
                           9,
                                 59,
                                        22,
                                               26,
                                                      ø,
                                                           117,
                                                                  10,
                                                                         46
400
            199,
                     6,
                                  9,
                                         θ,
                                                ø,
                                                    233,
     DATA
                          43,
                                                            81,
                                                                    1,
                                                                        139
             22,
                    26,
                           ø,
                                 46,
                                       137
                                                     43,
                                                             9,
418
     DATA
                                               22,
                                                                 131,
                   131,
                         251,
                                                6,
                                                    187,
                                                            62,
                                                                    0,
428
     DATA
              2,
                                 30,
                                                                        131
            235,
                     2,
                         139,
                                 23,
                                        46,
                                             128,
                                                     62,
                                                            36,
                                                                    9,
438
     DATA
                         129,
                                             117,
440
     DATA
            116.
                    86.
                                250.
                                        -2,
                                                    114,
                                                           137,
                                                                   30
                                247,
450
     DATA
             28,
                     Ø,
                          46.
                                        22,
                                              21,
                                                      9,
                                                            46,
                                                                 131,
                                                                         62
             21,
                           ø,
                                117,
460
     DATA
                     9,
                                        66,
                                              46,
                                                    199,
                                                             6,
                                                                   43,
                                                                          9
478
     DATA
              0,
                     ø,
                          46,
                                        38,
                                              16,
                                                            46,
                                                                 136,
                                138,
                                                      9,
                                                                         38
             14,
                          46,
                                136,
                                        38,
                                                      9,
486
     DATA
                     9,
                                              15,
                                                            46.
                                                                 199.
                                                                           6
```

Figure 1: The BASIC program that will request a "trigger key" from you and then create KEEPER.COM. Note that line 440 has only 9 data numbers.

```
510
               DATA
                         9,
                              116,
                                      15,
                                              46,
                                                    161,
                                                            24,
                                                                    9,
                                                                                 162.
                                                                                        246
         528
               DATA
                               46,
                                     163,
                                              37,
                                                      9,
                                                           232,
                                                                    1,
                                                                           2,
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496 DATA 17, 9, 252, З, 141, 6, 124, 11, 46, 163

500 DATA 28, 9, 232, 182. 1, 46. 131, 62, 24.

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Subiogic

Night Mission Pinhall

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better back-up.

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serial & game port. I/O bracket, and

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12
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1869	DATA	30,	28,	9,	46,	139,	54,	37,	9.	46.	139	
1979	DATA	132.	20.	1,	131,	198.	2.	61.	9.	9,	116	
1989	DATA	58.	139.	211,	131.	194.	2.	131.	250.	62.	124	
1090	DATA	3.	186,	30,	0.	59,	22.	26.	9.	116.	25	
1100	DATA	46.	131.	6,	37.	٩.	2.	137.	7.	131.	195	
1110	DATA	2.	131.	251.	62.	124.	3.	187.	30.	9.	137	
1120	Dama	20	20	a	225	100	46	100		26		
1130	DATA	0.	88.	91.	89.	90.	95.	94.	31.	251.	195	
1140	DATA	156,	30,	14,	31,	255,	30.	39,	9.	156.	128	
1150	DATA	62,	36,	91, 14, 9,	1.	116.	97.	250.	30.	86.	82	
1160	DATA	83,	80,	184,	64.	9.	142.	216.	139.	30.	28	
1179	DATA	ø.	46.	198.	6.	36.	9.	1.	46.	139.	54	
1180	DATA	37,	9,	46,	139.	132.	20.	1.	131.	198.	2	
1190	DATA	61,	9,	9,	117,	3,	235,	51,	144,	139,	211	
1200	DATA	131,	194,	2.	131.	250.	62.	124.	3.	186.	3.0	
1219	DATA	θ,	59,	22,	26,	θ,	116,	25,	46,	131,	6	
1220	DATA	37,	9,	3,	137,	7.	131,	195,	2,	131,	251	
1230	DATA	62,	124.	3,	187.	30.	9.	137.	30.	28.	0	
1249	DATA	433,	130,	40,	198,	٠,	36,	у,	υ,	88,	91	
1250	DATA	90,	94,	31,	157,	31,	207,	184,	0,	e,	142	
1269	DATA	216.	161.	36.	a.	46	163	32		161.	3.8	
1270	DATA	0,	46,	163,	34,	9,	199,	6,	36,	0,	45	
1280	DATA	9,	140,	163,	38,	9,	161,	112,	0.	46,	163	
1290	DATA	39,	9,	161,	114,	9,	46,	163.	41.	9.	199	
1300	DATA	6.	112.	ø.	113.	12.	140.	14.	114.	9 -	184	
1310	DATA	64,	0.	142,	216.	187.	30.	0.	137.	30.	26	
1320	DATA	ø,	137,	30,	28,	θ,	180,	15,	285,	16.	46	
1330	DATA	199,	6,	30,	9,	186,	3.	168.	4.	117.	14	
1340	DATA	40,	199,	6,	26,	9,	9,	128,	46,	199,	6	
1350	DATA	30,	9,	218,	3,	186,	229,	12,	205,	39		
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by sending a self-addressed, stamped (44 cents) envelope to Technical Editor, PC Magazine, One Park Ave., New York, NY 10016.—Ed.) If you typed all the data statements cor-

rectly (the program will tell you if you didn't), you will be asked to choose a trigger character that will be used to turn the window on and off. In selecting one. 'N, for example, make sure that it does not conflict with other "dedicated" key strokes that you use in your programs. When you exit BASIC, you will find that KEEPER. COM has been created for you, and it can be installed simply by typing KEEPER.

After installation, try typing a few lengthy commands that you wouldn't want to retype and then hit the trigger character. The 59-character-wide reverse-wide own dow should appear in the upper right section of the screen. Select the command line you want, hit the trigger key again, the window will close, and the command will execute.

What's Inside

As the number of Data statements in Figure 1 shows, Keeper is a substantial program. (The .ASM listing runs 9 pages-Ed.) This is because it has to do a good many things. It must monitor what is being typed, watching for its trigger key. After that key is typed it has to pop the window onto the screen by writing directly into the video buffer, so it won't interfere with any program then running. When the window is on, it has to watch what cursor keys are typed and move the selected line around to match. When a command is chosen. Keeper first has to turn off the screen window and then move that line into the keyboard buffer.

The keyboard buffer is a little group of 16 words in memory. Whenever you type something, that key's code goes from the keyboard directly into this buffer. If the program then running doesn't pull these keys out by reading them, the buffer continues to fill; if it fills completely, the PC's annoying, plaintive beep is sounded. If the buffer does fill up, Keeper wais: until characters are read out and only then stuffs the selected command line characters in. The PC's internal timer checks times a second to see if a character has been read out, thus leaving some space. If so, it pops in the next character from Keeper's stored command string, repeating this operation until they've all been read.

Working with the Screen

DOS provides a number of ways to portion the screen. One of these is to use DOS's own printing routines by handing a character to a DOS program. The lowest level—and the speediest—approach, received in the properties of the tech character in this buffer is stored as two bytes, consisting of an ASCII character code (such as 65 for A) and an attribute byte (such as 20 for reverse video), which will be displayed. By rapidly transferring will be displayed. By rapidly transferring to bytes, Kerper can make its window

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PROGRAMMING

seem to open and close almost instantaneously. This method is, in fact, the way many word processing programs display text, since it makes everything appear immediately on the screen. Similarly, many programs (Lotus's 1-2-3 is an example) bypass the normal BIOS procedure and read typed characters directly from the keyboard buffer.

The DOS Attachment

Keeper's utility would be lost entirely if you had to run the program each time you wanted to recall a previously entered command. Instead. Keeper must be deployed as a resident filter, through which all keystrokes flow unaffected until one matches the trigger key. The fact that such a filter is possible is one of the major advantages of an interrupt-driven operating system like PC-DOS.

Through a relatively simple assembly language procedure (the use of a specialized interrupt, Interrupt 27H), programs can become memory resident, effectively becoming part of the operating system. Such programs attach themselves in exactly the same way as do the major DOS programs like COMMAND.COM. This means that DOS will block off (literally, in the form of actual memory-allocation blocks) the part of memory the resident program is using. All subsequent programs will be loaded at positions higher in memory, ensuring that your program isn't overwritten. DOS even allows these attached programs to use its own internal stack, so the programmer doesn't have to supply one for them.

The use of this particular mechanism is what allows such programs as ProKey, Spotlight, SideKick, and Keeper to operate. When you run these programs the first time they employ an initializing "booster" program that attaches the necessary code. The initializing part of the code is then jettisoned by allowing itself to be overwritten. Such a programming provision makes DOS, at the very least, a civilized operat-

ing system. Now that you have the BASIC program and a civilized operating system to go with it, you might want to give Keeper a try. If you decide that you like it, it may get you started on doing some similar programming yourself.

Spreadsheet Clinic

Spreadsheet users share their tips on using 1-2-3's columnwise recalculation mode, checking formulas, and calling up worksheets

from a menu on your fixed disk.

"Stacking" Results of Repeated Calculations

In your Spreadsheet Clinic of April 2, 1985 (Volume 4 Number 7), you offer a solution to the problem of saving repeated calculations in different areas of the spreadsheet. I have a different approach that uses 1-2-3's Columnwise Recalculation mode to store results in a "stack " I can use this method to save the results of succeeding "what-if" calculations.

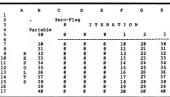
Figure 1 is an example of how it works. In the range B7..B17 are the results of a calculation. The calculation can be anything, but in this very simple example I have taken the variable in B5, reproduced it in B7, and increased it by 1 in each succeeding cell from B8 to B17.

Figure 1 shows the results (columns F. G. and H) of three successive iterations of this calculation, using three different variables. Obviously, the three variables were 10, 20, and 30. I can save as many different sets of results as I have "iteration" columns-in this case, six. Each time the worksheet is recalculated, column H picks up the results from column B, and every other "iteration" column picks up the values in the column to its right.

Figure 2 shows the formulas that make the technique work. I have left out columns C, D, and E because their formulas are identical to those in columns F and G: they point to the values in the column to the right. The @IF logical operator is nothing more than a method to set the stack values back to zero for another round of calculations. Thus, if the zero-flag value in cell C3 (range name ZERO) is set to anything

sheet will reset all values in the iteration | columns to 0. Note that this method will work only in manual Columnwise Recalculation mode.

In this mode, calculations are made one column at a time, beginning with column A and moving left to right. In the default recalc mode (Natural), all the values in the



	λ	В	P	G	В
1					
2 3					
3					
4 5 6 7 8 9		Variabl			
5		16	@IF(\$IERO, #,+G5)	@IF(\$ZERO, #,+B5)	#IF(\$ZERO,#,+H5+]
6					
7		1*B5	#IF(SIERO, #.+G7)	PIF(SEERO, 0.+B7)	#IF(SZERO, #.+B7)
8		+B7+1	#IF(\$ZERO.8.+GB)	#IF(SIERO, #.+HB)	01F(\$ZERO, 0,+B8)
9	R	+B8+1	#IF(SZERO.#.+G9)	#IF(SIERO,#,+B9)	#IF(\$ZERO,#,+B9)
10	E	+B9+1	#IF(SZERO. #.+G1#)	FIF (SZERO, #.+B1#)	#IF(SEERO, 8.+B1#)
11	s	+B1@+1	#IF (SZERO, #.+G11)	#IF(SZERO, #,+H11)	#IF (\$ ZERO, # . +B11)
12	Ü	+B11+1	#IF(SZERO,#,+G12)	#IF(\$ZERO.#.+812)	#IF (\$ZERO, #,+B12)
13	ī.	+812+1	FIF(SIERO, #.+G13)	@IF(\$ZERO, #,+B13)	@IF(\$ZERO, #,+B13)
14	7	+B13+1	#IF(\$ZERO, #.+G14)	FIF (SIERO, F.+B14)	@IF (\$2ERO, 0,+B14)
15	s	+B14+1	@IF(\$2ERO, #,+G15)	@IF(\$ZERO, #,+B15)	EIF(SEERO, 0,+B15)
16		+B15+1	PIF(\$2580, 0.+G16)	@IF (\$ZERO. @.+H16)	#IF (SZERO, # .+B16)
17		+B16+1	#IF(SIERO, #.+G17)	FIF (STERO, # .+B17)	STF(SEERO, #.+B17)

other than 0, a recalculation of the work- Figure 2: The formulas that make the stack work.

iteration columns would immediately take on the values in column H.

At home I use the stack technique to store the results, for the next 30 years, of different possible refinancings of my home mortgage. At work I use it for storing the results of amino acid composition data

from different proteins.

Raymond C. Duhamel Tucson, Arizona

I have added one element to this useful model: a flag to indicate that the stack is full. If you had a large worksheet, you might not notice that it was full; succeeding calculations would push the results of the first calculations right out of the stack. and their values would be lost. In cell B2 I have added the formula

@IF(D5>0.6.@FALSE)

and given the cell the + . - format. So long as the iteration number for column D remains zero, only a period appears in cell B2. As soon as D5 pets an iteration value. six plus-signs appear in B2.

Since the worksheet is doing left-toright, columnwise recalculations, the flag will not fly until the value in D5 is 2 and column C also contains results. If the flag were to the right of the iteration columns, it could point to C5, instead of D5. and give the same results.

Viewing Formulas Instead of Values When trouble-shooting a 1-2-3 worksheet with many formulas, it's sometimes more useful to see the formulas themselves rather than the values they produce. The Lotus manual recommends printing the worksheet using the /Print Printer Options Other Cell-Formulas command, but that gives you the contents of only one cell per line of printout. It's hard to tell how the cells re-

I prefer the /Range Format Text command. If you use this command on only those formulas you want displayed, the rest of the worksheet will remain intact and you can see how the formulas fit into it. However, you may have to temporarily increase column width in order to display long formulas.

late to each other because they all appear

stacked in one long column.

This procedure is in the Lotus manual,

how useful it can be.

Jeffrey Katz New Bedford, Massachusetts

Good idea. You can print out the worksheet or trouble-shoot it on screen.

CURRENT 1-2-3 FILES

Hard Disk Menu When you use 1-2-3 with a hard disk, it's convenient to keep different kinds of files

in different subdirectories. The macrobased menu system that is shown in Figures 3 and 4 is easy to use and lets you

switch subdirectories and retrieve commonly used files. If the menu system is put into a file

named AUTO123.WKS, it will load automatically when you start up and display a menu as in Figure 3. If you give cell J8 the range name \O the macro will also start up

Personal bank account Company bank account Investment Portfolio Software list 5 CHANGE DIRECTORY to B: CHANGE DIRECTORY to C:\PERSONAL CHANGE DIRECTORY to D:\BUSINESS / File Retrieve - normal FILE RETRIEVE this sub-directory LEAVE THIS MENU PROGRAM, ERASE SHEET

Enter Number of File to Use 5

To retrieve this AUTO123 command file, press Alt A

```
Flaure 3: This is the screen that will annear when you start Latus's 1-2-3
           *\A*
                     /FRAUTO123~
           -\e-
                     {GoTo}E16~{?}~
   8
                                              Cursor to E16, accept input.
                     /XIE16=1"/XGJ28"
/XIE16=2"/XGJ22"
                                              Series of IF statements
 18
                                                 that cause
 11
                     /XIE16=3"/XGJ24"
                                                 macro to branch
                     /XIE16=4"/XGJ26"
/XIE16=5"/XGJ28"
                                                 according to number
                                                 input by
 14
                     /XIE16=6~/XGJ38~
                                                 the user.
                    /XIE16=7"/XGJ32"
/XIE16=8"/XGJ34"
/XIE16=9"/XGJ36"
 15
                                                 Branches are
numbered below.
 17
 19
 28
                    /FDB:\PERSONAL"/FRbankac"
 21
 22
                    /FDB:\BUSINESS"/FRcobank"
 23
 24
              3
                    /FDB:\PERSONAL"/FRinvest"
 25
                    /FDB:\BUSINESS"/FRaoftwr"
 26
 28
                     /FDB:\~/FR
 29
38
                     /FDB:\PERSONAL --
 31
 32
                     /FDB:\BUSINESS""
 33
 34
                     /FR
 35
                     /WEY
```

but the manual give you no explanation of | Figure 4: This macro selects hard disk directories and retrieves files

immediately. It will send the cursor to cell E16 (the data entry cell), prompt you to make a selection, and then execute your choice.

The key to the macro is the series of IF statements in Figure 4. These cause the macro to branch to the different choices in cells J20 to J36. These choices must, of course, match the menu choices in Figure 3. but you can modify all of them to suit the needs of your system. You are limited only by your imagination and by what 1-2-3 allows.

If you keep a copy of this file in all of your subdirectories, you can use it whenever you need to switch files or change drives. Also, even after you have made a choice from the menu, you can cause the macro to reexecute by hitting Alt-A. This reads the file in from disk once more and O autoexecutes all over again.

George Hagen Sarasota Florida

This is an interesting alternative to macros I have seen that do the same thing by setting up menus with the /XM command (See Spreadsheet Clinic, Volume 4 Number 13). With the /XM command, you can choose from no more than eight options. but Mr. Hagen's method lets you choose from as many options as you can cram into one screen. Also, since you're not dealing with the control panel, you have greater freedom in setting up text to describe your menu chaices

I assume that the branches in Figure 4 (J20, J36) are double-spaced so that each macro branch will end without running on to the branch below. You can save space by adding a IXO to the end of each branch and removing the blank lines. /XO will halt the macro. Just remember to renumber the XG commands in cells J10 to J17

Also, the Alt-A macro, which causes the whole thing to reexecute, can be eliminated. It's there only because you can't re-

start an autoexecute macro by hitting Alt-O. You can, however, give cell J8, which starts the autoexec macro, a second range name (sav. \ R for repeat). The macro will still autoexecute, and by giving J8 another range name, you can restart the autoexec macro just as you would any other macro. by hitting Alt-R. Reexecution is much quicker because you don't have to read the file in from disk again in order to restart the macro.

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EDITED BY JOHN DICKINSON

Power User

Readers can use this forum to share their best hardware and software applications discoveries.

Each day's mail seems to brine more good ideas about how to make the job of sending command sequences to your printer easier. Since there's no accounting for taste, we're printing as many as we can.

Perforation Problems

Many programs don't bother to skip over the perforations when printing on continuous form paper, and that can make a real mess, with characters printed half on one page and half on the next. You can change the DIP switch settings on an Epson MX, RX, or FX printer to enable a "skip over perforation" of about 1/2 inch on either side, but that's time consuming and can ruin the efforts of programs that are smart enough to skip the page breaks.

As usual, there is a better way. Use your favorite editor to make a pair of batch files (call them PGBRKON BAT and PGBRKOFF BAT, or something else easy to remember). Run PGBRKON before you print your listing (or whatever) and PGBRKOFF afterwards. PGBRKON copies a file named PGBRK.BEG (Figure 1) to the printer, which enables a "skip over perforation," and PGBRKOFF copies a file named PGBRK.END to the printer, which disables it. This is PGBRKON BAT:

copy pgbrk . beg prn: This is PGBRKOFF.BAT:

copy pgbrk.end prn:

All you need are the two files, and the BASIC program in Figure 1 generates them for you.

PGBRK.BAS will generate files that tell your Epson printer to skip over SKIP-LINE% lines. The lines will be divided evenly between the current and next pages. If SKIPLINES% is set to 12, six lines will be skipped on one page and six on the next. The only restriction to correct operation is that SKIPLINES% cannot be less than 0 or greater than 127.

Ken Kriesel Madison, Wisconsin

The "Skip Over Page Break" is a handy. but often overlooked, feature of Epson printers. It can save you lots of aggravation, especially when listing programs

from BASIC or another program editor. I modified your program slightly to allow it to work with IBM as well as Epson printers. The current version of PGBRK.BAS will work correctly for all IBM printers (including the new Proprinter) and all compatibles, such as the Centronics GLP, Okidata Plug 'N' Play, and Riteman Blue Plus.

Toggling Your Print Modes PRINTER.COM is an assembly language program I wrote to toggle the print modes

REM program to create PGERK. REG and PGEPK. END SKIPLINES%=12 29 REW However many you like so long as it's less than 127 OPEN "PGBPK.REG" POR OUTPUT AS PRINT #1,USING "\";CHR\$(27)+"N"+CHR\$(SKIPLINES\$); 38 CLOSE . OPEN "PGBRK.END" FOR OUTPUT AS 1 PRINT #1,USING "\\";CHR\$(148)+CHR\$(27)+"O"; CLOSE 1

Figure 1: The BASIC program to create the PGBRK BEG and PGBRK END files.

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MARM

584 CASTRO ST. SUITE 487, SAN FRANCISCO, CA 94114 orthogonal NCSS for All removator & Software and CIRCLE 107 ON READER SERVICE CARD 201 program takes up fewer than 500 bytes. making it reasonable to store it on your word processing program disk and select letter for each printer you want switched command sequences and adding or sub-

; by Anthony J. Bucci Jr., N. Providence, R.J.

; PRINTER.ASM (c) 1984

of my Okidata Microline 92 printer. The | the print modes you want before starting | on; PRINTER does the rest. It can easily your word processing program.

; This program sets Ckidata 92 printer modes. Adopt to your printer

be adapted to other printers by changing It's fast and easy to use. Just enter the the character codes used in the printer

```
: by substituting its control codes for those in this program.
CSEG
        SEGMENT PARA
                                          ; Beginning of Code Segment
        ASSUME CS:CSEG, DS:CSEG, SS:CSEG, ES:NOTHING
                                          ; Origin 100H for .COM program
BEGIN:
        LEA
                DX, MESSAGES
                                          : Put address of message string in DX
        MOV
                AH, 9H
                                          ; DOS service 9 - Display string
        INT
                 21H
                GET_KEY
        JMP
                         AH, 8H
GET_KEY: MOV
                                          : DOS Service 8 -- Key input
                 21 H
                                          ; But don't display key pressed
        INT
        AND
                                          ; Make sure returned key is upper case
                AL,95
        PILSH
                                          ; Save AX on stack for later use
                AX
                DL, AL
        MOV
                                          ; Put Key Pressed into DL
        MOV
                AH, 02H
                                          ; DOS Video output display (1 char)
        INT
                 21 H
                DL,';'
        VOM
                                         ; Display a semicolon
        INT
                DL.''
        MOV
                                         ; Display a space
        INT
                 21H
        POP
                                         ; Restore AX
                AΧ
                AL,65
                                         ; Normalize to zero at 'A'
        SUB
                                          ; Check for letter 'M' (exit code)
1S LAST: CMP
                         AL,12
        JE
                                          ; Go exit if pressed
        JA
                                          ; Get another key if not in table
                GET KEY
        CBW
                                          ; Convert AL to word in AX
        MOV
                 DX, BYTES_PER_CODE
                                          : Load DX with Bytes per Code
        MUL
                                          ; Multiply AX by DX
        NOV
                 BX.OFFSET CODE TABLE
                                          : Load Code Table Address in BX
                                          ; Point to correct entry using AX
                 BX,AX
        XOR
                 CX,CX
                                          : Clear CX
        MOV
                 CL, BYTE PTR [BX]
                                          ; 1st byte of table is byte count
                                          ; DOS service sends char to printer
        MOV
                 AH.5H
                                          ; Loop through table, send codes
PR_LOOP: INC
        MOV
                 DL.BYTE PTR [BX]
                                          : Load code to DL
                                          ; Call DOS
                 21 H
        LOOP
                 PR LOOP
                                          : Repeat
        JMP
                 GET_KEY
                                          ; Go get another key
EXIT:
        MOV
                 AE.9H
        MOV
                 DX,OFFSET EXIT_MSG
                                          ; Display Exit Message
        INT
                 21H
        INT
                 20 H
                                          ; Terminate program
; First block of messages prints out on entry to the progrm
; It is the menu of printer options supported for the M92
                                                                         (Figure 2 co
```

tracting items from the menu.

To make the program work, just type it up on your favorite editor or word processor, and assemble it using ASM or MASM. Then link it and convert it to a .COM file using the EXE2BIN program.

Anthony J. Bucci, Jr. North Providence, Rhode Island

Right you are. Anthony. At your suggestion. I modified your program to make it more compact, and both the source code and the .COM file are considerably

shorter than the originals (see Figure 2).

MESSAGES

codes are in the table called CODE TA-BLE that, in this implementation, allows 2

bytes per printer command sequence. One additional byte (the first one) for each entry indicates how many bytes there are for the code. If your printer needs more bytes per code, just change the BYTES PER CODE variable in the EOU statement.

and be sure to add enough zeroes where necessary to pad out the table (each code entry must be exactly the same length). To change the number of menu items

for your printer, just change the message block to add or subtract items and then The biggest change is that the control chonge the 12 in the statement labeled IS

DB 13.10, Okidata Microline 92 Printer Setup Program', 13,10,10

LAST: to whotever number is appropri-

PRINTER.COM will be on PC's Interactive Reader Service, along with the source code.

Hex Dumps

When doing communications work between PCs or between PCs and a mainframe, it would be nice to be able to display the actual ASCII codes that are coming over the communications link in order to determine what particular characters are causing you a problem.

A number of communications pro-

```
DB 'Press:',9,'A - Condensed Print',
          MSG
                                                                    13,10
                                9,'B - Double Width',
          MSG 1
                                                                    13.10
                                9.'C - Normal (10 CPI)',
                                                                    13.10
          MSG_
                   DB
                                9,'D - 12 CPI'
          MSG 3
                   DB
                                                                    13,10
                                9,'E - Letter Quality',
                                                                    13.10
          MSG_4
                   DB
                                9.'F - Data Processing
          MSG
                   DB
                                                                    13,10
                                9,'G - Enhanced Print
          MSG_6
                   DB
                                                                    13,10
          MSG 7
                                9, 'H - Emphasized Print'
                                                                    13,10
                   DB
                                9,'I - Stop Enh. or Emp.'
                                                                    13.10
          MSG_8
                   DB
          MSG_9
                                9,'J - 6 LPI (normal)',
                   DR
                                                                    13,10
                                9.'K - 8 LPI (condensed)',
          MSG 10
                   DB
                                                                    13,10
          MSG 11
                                9,'L - Defaults (clear buffer)
                   DB
                                                                   13,10
13,10,10,'$'
                                9,'M - EXIT this program',
          MSG 12
                   DB
  ; Exit message
 EXIT_MSG
                   DB 13,10,10, '**Exit**',13,10, '$'
   Code Table -
 ; 1st Byte is count of bytes to read for this entry
 ; Subsequent byte(s) are the actual printer codes
  ; Max of two bytes per code for this implementation
 BYTES_PER_CODE
                   EQU
                            1 + 2
 CODE_TABLE
                   DB
                            1,1DH,
                                              : Condensed
                   nR
                            1,1FH,
                                     ø
                                              : Double Width
                   DB
                            1,1EH,
                                     ø
                                             ; Normal 10 CPI
                   DB
                            1,1CH.
                                             ; 12 CPI
                   DB
                            2,1BH,31H
                                             ; Letter Ouality
                   DB
                            2,1BH,30H
                                             ; Data Processing
                   DB
                            2,1BH,48H
                                             ; Enhanced
                   DB
                            2,1BH,54H
                                               Emphasized
                   DB
                            2,1BH,49H
                                             ; Stop Enh or Emp
                   nn
                            2,1BH,36H
                                                6 LPI
                                             ;
                            2,1BH,38H
                                                8 LPT
                   DB
                   DR
                            1,18H, Ø
                                              ; Set Defaults
 CSEG
          ENDS
                                              ; End CSEG
          END
                   BEGIN
                                                                                (Figure 2 ends)
PC MAGAZINE . JULY 23, 1985
```

POWER USER

grams do provide you this facility. Many, however, do not. Another way to look at the characters is to direct the transmission to a file and then view the file contents with DEBUG. Unfortunately, many people are not comfortable with DEBUG.

A simpler and potentially more useful alternative is available for people with Epson FX series printers. One of the printer's built-in features is a hex dump of the character codes being sent to it. If you hold down the FF (from feed) button on the FX series as you switch it on, the printer is put into hex dump mode, and all characters sent to the printer are printed in their hexactive decimal representation on the paper.

occuma representation on the paper.

Since most communications programs allow you to route the received data to the printer, you can now view the characters coming in over the communications link in their hex representation to help you in your debugging effort. If your package does not allow you to print the data coming over the

communications link, you can use the Cti-PrtSc key combination to route the screen display to the printer. In this case you will have to separate lines generated locally from those received over the communications link.

This method can also be used to display data in any type of file, whether you type it on the printer, print from a BASIC program, or want to see output generated by your word processor or spreadsheet.

Michael J. Heron Brook Park, Ohio

I wish all printers had a hex dump feature. Several new printers have come out with it, including IBM's new Proprinter (they're taking their Epson printer heritage seriously, even when they design their own

printers).

There are many other uses for the hex dump feature. For example, if you're having trouble with the interface between your

word processor and printer, you can look at the hex dump and figure ou what's so ing on. If you don't have an FX-80, borrow one, or another printer with hex dump, and hook it up long enough to figure out the problem.

Printing the Word

Here's a little tip for Microsoft Word users who bought a new printer for Christmas and are frustrated because Word doesn't appear to support all the printing options available with their nifty new printer (especially color printing on the new Epson JX-

80 printer).

Ward allows you to enter printer control codes directly into your document by using the Alt key and the numeric keypad. This means that you can switch on color (or any other type font or option) by entering the decimal codes on the numeric keypad. For example, if you want magenta printed on the Epson JX-80, you would enter the follower.



lowing at the point where you wanted the color to start:

Press NumLock to turn NL on.

 Hold down Alt and type 27 (the decimal code for escape) on the numeric keypad (you must use the numeric keypad or this won't work).

 Release the Alt key. If you've set Word's display options to printer display, you will see a left arrow. It's a good idea to set your options to see these codes.

 Hold Alt and type 114 (the decimal code for r). Then release Alt. You can get any decimal character codes you need from the back of the BASIC manual or your printer manual.

 Hold Alt and type 1 (the code for magenta). Then release Alt again.
 The text following this sequence will be

The text following this sequence will be printed in magneta.

To make things simpler in the future, you can place the sequence into Word's glossary (you may wish to create a custom

glossary for this purpose). Extend your selection (F6) to cover all the codes, then do a COPY command to place the codes in a glossary entry called MAGENTA. Then, to get magenta text, type the word magen-

Word allows any of the PC's 256 characters (except character 0) to

be inserted in a document,

ta, hit the F3 (Ref) key, and the word magenta will be replaced by the correct printer codes.

Don't forget to enter the code for black printing to return your printer to normal (black) text. If you decide to use a glossary entry, don't forget to make a black entry as well

> Amy J. Goebel Alexandria, Virginia

Wead allows any of the IBM PC's 255 characters (except character 0) to be inserted in a document with the Alt key and
numeric keypad. When I tried this out with
Wead 2.0, it didn't require me to put the
keyboard into NumLock, and the Esc and
other control codes were displayed correctly in normal display mode. You should
also be aware that you can use the
CONVPRD utility that comes with Word to
modify your PRD file.

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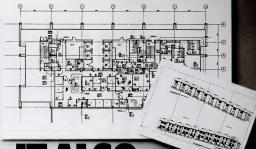
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EDITED BY PAUL SOMERSON



User-to-User PC readers use this forum to help one

another by passing along their solutions, comments, and complaints.

Poor Man's MODE

While the DOS MODE command performs a variety of I/O functions, many readers probably use it only to select video modes. It's possible to bypass MODE .COM and do this directly by using the SCREEN.COM program in Figure 1, which speeds things up and saves 5K of space on your disk.

Once you've entered the program using the DOS 2.x or 3.x DEBUG mini-Assembler, simply use the command SCREEN N, substituting a number from 0 to 3 in place of the N. Here is a table of the new SCREEN N values, along with their old MODE Naminal

NEW SCREEN "N"	OLD MODE . COM "N"
ą.	B#40 (or 40)
2 3	BW80 (or 80)
٥	COBU

Jon M. Etheredge Fredericksburg, Virginia

While this does the job, MODE.COM comes in handy elsewhere and at 5K isn't much of a space hog, especially on a hard disk. But if you're tight for space on a floppy, or if you want to give away or sell a disk and don't want to put IBM's copyrighted MODE.COM on it, this is for you.

More DOS Menu Magic

A User-to-User submission in PC Magazine (Volume 4 Issue 6) contained instructions for creating GETKEY.COM, a tiny, simple program that accepts keyboard input in a batch file. The ASCII value of a key is returned in the ERRORLEVEL, which can be accessed by statements of the type "IF ERRORLEVEL ## <do something>". I've created a slight variation called GETFUN.COM that will let you use function keys as inputs for GETKEY (see Figure 2).

GETELIN COM returns the extended scan code for the function keys (and other keys-see Figure 3) and returns 255 if a nonspecial key is pressed. As was explained, the "IF ERRORLEVEL" condition is true if the error level is less than or equal to the returned code.

A batch file menu created around GET-FUN should have the following features

(see Figure 4): 1 There must be a label, such as :CHOICE, just before the call to GET-FUN, and another, such as :BEGIN, before any lines that display a menu.

2 The IF ERRORLEVEL statements must be in descending numerical order and should be a continuous sequence. If they

A>debug -n screen.com

-g

	- <u>a</u>
U	xxxx:0100 gor ax.ax
п	xxxx:0102 mov bx.0081
н	xxxx:8185 cmp byte ptr [bx].28
п	xxxx;8188 inz 818d
	xxxx:010A inc bx
	xxxx:010B imp 0105
	xxxx;818D mov al.(bx)
	xxxx:818F cmp al.33
	xxxx:0111 ja 0117
	xxxx:8113 cmp al.2f
	xxxx:0115 ja 0119
	xxxx:0117 mov al.33
п	xxxx:8119 sub al.38
Н	xxxx:811B int 18
п	xxxx:011D int 20
н	xxxx:011F
П	-rex
Н	CX 8888
н	:lf
н	-x
П	Writing 881F bytes

Figure 1: Instructions for creating SCREEN.COM, to change video modes. Type in everything underlined and hit the Enter key at the end of each line, including the one above -RCX. Ignore the xxxx:; the hex numbers that annear here will vary from system to system.

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USER-TO-USER

can't be continuous, holes must be filled with statements that transfer control back to CHOICE (e.g., IF ERRORLEVEL 71 GOTO CHOICE).

 Since the user may press keys other than those we expect, put a line just before the highest ERRORLEVEL that says IF ERRORLEVEL (highest + 1) GOTO CHOICE.

 To catch keys pressed with a lower value than expected just after the sequence of IF ERRORLEVEL, put in a simple GOTO CHOICE.

 Each section of code that is GONE TO should end with a GOTO BEGIN.
 The "heart" of GETFUN and GET-

KEY is the call to DOS function GC, which sets the ERRORLEVEL to the value in AL. When called with 0 in AH, internal of the return the ASCII value of the key in AL. Certain keys, such as function or arrow keys, have no ASCII value—in these cases AL gets a zero, and a special code is zero. If it's found, the special code is zero, it's found, the special code is zero. If it's found, the special code is zero. If it's found, the special code is zero. It is filled with Fr (doctinal 25%). Thus are nonspecial key will have a higher

ERRORLEVEL than any special key.

The usefulness of this procedure is immense in a big batch file menu system on a hard disk. I converted 40 small batch files with names A.BAT. B.BAT, and so on

```
A>debug getfun.com
File not found
-xxxx:0100
               MOV AH.00
INT 16
-xxxx:8182
-xxxx:0104
               CHP AL. 00
               JZ B18C
MOV AL.PP
JMP B18E
-YYYY - 8186
-xxxx:8188
-xxxx:818A
-xxxx:918C
               MOV AL. AB
-vvvv. 616E
               MOV AH.4C
-xxxx:0110
-xxxx: 0112
:8812
```

Mriting 8812 bytes

"Egure 2: Type in everything underlined to
create GETFUN-COM. His the Enter key at the
end of every line. Ignore the xxxx; the hex
numbers that appear here will vary from system

into one big batch file. Since each file on my particular hard disk takes 4K (cluster of 8 sectors), this was a huge saving of wast-

> Neil J. Rubenking 300 Page Street San Francisco, CA 94102

From the level of mail on the subject, the ERRORLEVEL menu trick is rapidly gaining in popularity, as it doesn't force users

```
FUNCTION KEYS ----
F1...F18
               unshifted
                               59...68
P1...P10
               shift
                               84...93
F1...F18
               Ctrl
                               94...183
F1...F10
               Alt
                               184...113
     ******* KEYPAD KEYS
       unshifted
                         Ctrl
                         119
          72
          73
                          132
Left
          75
                          116
Right
          79
End
          20
PgDn
                          118
          82
Del
********* ALT + REGULAR KEY **********
               16...25
QWERTYUIOP
ASDPCRIEL.
EXCVBNK
               44...58
1234567898--
               128...131
```

to system.

ed space.

FIGURE 3: Extended keyboard scan codes to be used with GETFUN.COM.

choices. The trick here makes it even better. Mr. Rubenking sent this submission to

to hit the Enter key to enter their menu | shareware programs he calls PIANO-MAN. If you're interested in a program that very cleverly lets you play your PC us along with a menu-driven set of like a piano-and comes with a slew of interesting classical pieces (including the theme to Monty Python's Flying Circus and The Lone Ranger) already keyed in and ready to play at the touch of a function key, contact him at the above address.

```
Screen Blanker
```

For users who leave their monitors on all night to use the CTTY remote control, the program in Figure 5 will blank their screens as recommended in "Remote Access with CTTY" (PC, Volume 4 Number 3, page 337).

To enter the program, use the Macro Assembler or the mini-Assembler in DOS 2.x. To run the program, simply type BLANK at the DOS prompt. To return from the blank screen, use the DOS MODE command or change the byte at &H108 from 00 to 07.

```
Edison Hsu
Glendale Calif
```

While this does blank the screen, it leaves the border color intact on a color screen. If you want to turn the border black also (so the whole screen is blanked), change the code slightly as reflected in Figure 6. There are many uses for this kind of screen blanking program.

```
A>DEBUG
-A 108
xxxx: 6188
             MOV DX.1958
MOV CX.8888
xxxx: 8183
xxxx:8186
xxxx:8189
             MOV
xxxx:#18B
xxxx: 010D
xxxx: @ler
xxxx:8112
vvvv. 0113
xxxx: 0115
-RCX
CX 8888
:114
-N BLANKALL COM
Writing 8114 bytes
```

Figure 6: BLANKALL.COM adaptation of BLANK.COM screen blanker to turn border color black on color screens. Follow the san basic instructions as listed for entering BLANK.COM. To create an UNBLANK.COM version of this, make the two changes mentioned in the BLANK.COM instructions. and enter MOV AL.# instead of MOV AL.00substituting the hex number of your border color (3=cyan, 2=green, etc.) for the #

```
ECHO OFF
CLS.
· BEGIN
ECHO
               ----MENU:--
ECHO
          Fl
               SPACE PERVADERS
          F2
ECHO
               WORDSTAR
ECHO
          F3
               DBASE
ECHO
          PA
               EXIT TO DOS
ECHO
      PRESS A FUNCTION KEY TO CHOICE
ECHO
: CHOICE
GETFUN
IF ERRORLEVEL 63 GOTO CHOICE
IF ERRORLEVEL 62 GOTO EXIT
IF ERRORLEVEL 61 GOTO DRAS
IF ERRORLEVEL 60 GOTO WRD
IF ERRORLEVEL 59 GOTO SPACE
GOTO CHOICE
:SPACE
BASICA PERVADER
GOTO BEGIN
:WRD
WS
GOTO BEGIN
:DBAS
DBASE
GOTO BEGIN
PEXIT
CLS
```

```
FIGURE 4: This sample menu allows GETFUN.KEY to use function keys to select menu choices.
   A>DEBUG
   -A 166
xxxx:0188
                                      Set parameters to blank
                MOV DX.1958
MOV CX.8888
MOV AX.8688
    xxxx:8183
                                         the screen
   xxxx: 8186
                 MOV BH
INT 18
INT 28
   xxxx: 8189
                       H. 99
                                      :Use MOV BH, 07 for UNBLANK.COM
   xxxx:818B
                                      Calls CRT Interrupt
   xxxx:818D
                                      Returns to DOS
   xxxx: 01 0F
                                      Remember to hit Enter key here
   CX BBBB
       BLANK . COM
                                      :Use UNBLANK.COM for other version
   Writing 818F bytes
```

Figure 5: Instructions for entering BLANK.COM screen blanker. Type everything underlined, Ignore the four Xs at the beginning of each line and everything following semicolons. For UNBLANK.COM, substitute MOV BH.07 for the line MOV BH.00, and N UNBLANK.COM for N BLANK COM. Hit the Enter key at the end of every line, including the one after INT 20.

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For example, notice that PC Paintbrush will run on most 320 x 200 graphics cards plus 19 higher resolution ones including the IBM Enhanced Graphics Adepter, PC[r., Tecmar Graphics Master, and Hercules monochrome and color boards. PC Paint runs on just 3.

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	_	
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PCPAIN	I BHUSH F	CPAINI
Max resolution	720x704	320x200
Compatible		
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Printers/Plotters	30	3
Input Devices	9	1
On-Screen Colors	16	18
Number of Fonts	14	5
Font Sizes	9	3
Text Styles	15	3
Drawing Line Widths	10	4
Enlargement/		
Reduction	Yes	No
Slide Show		
Presentation	Yas	No
Area Fili	Yes	No
Zoom	2	1

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even readable). Recently we heard that IBM has an Enhanced Graphics Adapter. While this sounds promising, we're shy about investing still more money unless we know it will work. Can you advise us?

Virginia Welsh Hummelstown, Pennsylvania

A: There are any number of routes you can take. The most expensive approach would be to purchase an IBM Enhanced Graphics Adapter and an Enhanced Color Display (about \$1,500 total). While this will provide nice color and a high-resolution text display, it may well be a case of "overkill." so its utility to you should be carefully considered.

A somewhat more reasonable approach might be to purchase a regular IBM Color Graphics Adapter (CGA), or similar card, since you already have highresolution text available via your monochome adapter. Many of the non-IBM graphics cards have higher-resolution graphics with CGA compatability, for about the same price as IBM's own CGA. I would not suggest any card with an integral printer port, however, since you al-

ready have two connected to your system.

The ports may conflict. Your primary problem is the display itself. Most TV sets, especially when fed through mediocre RF modulators, produce truly terrible results. If you have to stay in the \$100 range, you might be able to get acceptable graphics from a highresolution B/W monitor. Better yet, for about \$300 you can afford one of the newer medium-resolution color monitors or monitor/TVs, such as those now sold by Sears. Make sure the monitor has a direct video input (plugs right into the RCA jack on your PC) so you don't need an RF modulator, Removing the RF modulator/demodulator stage always increases the res-

olution. For about \$400 to \$500, you can purchase a high-resolution RGB color monitor. This should come with (or you must buy additionally) a standard 9-pin cable that plugs into the connector on your color

In all cases, however, I suggest you try the monitor (or perhaps a couple at a time) to see how your picture looks. If you are worried about using 80-column text, perhaps for a word processor, restrict your attention to the high-resolution monitors. Since you already have a monochrome display and adapter that can handle 80-column text. I would suggest you worry more about the appearance of the graphics you want to produce.

Too Much Memory?

Q: For some reason, the programs I wrote in IBM COBOL (Version 1.0) with my previous PC (which had only 256K) don't work on my new PC-XT (640K). I repeat-



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PC TUTOR

edly get the weird message "Program is too big to fit in memory." I have tried to recompile the programs on the XT, but 1 always get that same error message. (By the way, the programs involved all worked well on my previous PC, and I have checked my XT as thoroughly as I know how.) Can you tell me what's going on? Handi Homann

Oldbridge, New Jersey A: You might contact your IBM dealer to

find out if there have been any changes to the compiler that might cause the problem

My IBM Macro Assembler sometimes gives me the message "Not enough memory" on my AT, which has a full 640K. The fix I found was easy: I just call the assembler from my word

processor.

you have mentioned. If not, I can suggest a possible fix. I have noticed that my IBM Macro Assembler sometimes gives me the message "Not enough memory" on my AT, which has a full 640K. The fix I found sounds odd but was actually easy: Now I just call the assembler from my word pro-

Seriously, the problem was that I had too much memory (more than 512K). The result was that the program interpreted my machine's memory capacity as a negative number. Running the assembler from my word processor reduced the available memory 512K, which cleared up the Macro Assembler problem completely. You might try a similar kind of fix, using any technique that reduces memory. Run PRINT, a small RAMdisk program, another print spooler, or the like, so that you end up with less than 512K available when you try to run your COBOL application. If this does not work, see if you have a DIP switch setting on your memory board that will disable some memory, so that your total drops under 512K. If the altered XT still does not work, then it must be an interaction with the ROMs in the XT in which

case you need a new (hopefully free) CO-BOL compiler.

High Memory and Low Prices

Q: I own an IBM PC AT with a 20-megabyte drive, I floppy, and 512K of memory. I understand that I can only upgrade this memory to 640K before I go into high memory. What does this mean's

Also, is there any place I can purchase cheap 256K chips to increase the memory of my AT? Is it worth increasing the memory to 1 megabyte? I would also like to get a 360K disk drive for my lower slot. What is the best kind to buy? Who makes them for IBM? Maybe I can buy one of theirs without the IBM label for less money?

Nestor Portocarrero Coral Gables, Florida

A: The IBM PC family is limited to 640K of main memory because of several factors. Primarily, the video display memory is expected to reside at some point between 640K and 770K. Further, in all PCs the ROM BIOS and BASIC interpreter in ROM are located at approximately 900K.

High memory is that memory located above I megabyte in the address space (that is, just beyond the ROM BIOS), On an AT you can theoretically address 16 megabytes. DOS, however, will refuse to use anything other than the main memory below I megabyte. You can use that additional memory for a RAMdisk if you want. I currently have 890K (giving a 256K RAMdisk and 640K working area) and would like to have more for a larger RAMdisk. Since most applications today are quite comfortable in 512K, getting more than 640K for DOS doesn't seem all that useful, save, perhaps for Symphony or TopView

As for buying 256K chips, this should be relatively easy. Just take a look through the back of most computer magazines. One good information source is Electronics Week, a newspaper-like publication that often has chip dealer advertisements in the back.

I'm not certain who produces IBM's drives currently, but like any other company in a competitive environment, they shop for the best price/performance ratio. You don't purchase in the quantities that IBM does, so I seriously doubt that you could

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match their prices. My experience with drives leads me to believe that most of the higher-quality manufacturers produce roughly similar drives. I would advise you to stay away from the very inexpensive offbrands: rumor has it that they devour double-sided floppies. Personally, I have had good experiences with drives from Teac. Shugart, CDC, Tandon, Matsushita, and

Communicating Binary Files

O: I would like to use a modem to send and receive word processing documents, spreadsheet worksheets, and other binary files that may contain any or all of the 256 possible 8-bit byte values, Is the 7-bit AS-CII format the only one allowed over the telephone lines? Does any communications software send and receive binary files without first running them through a binary-to-ASCII conversion utility and reconverting them at the other end? Is there a standard protocol for sending 8-bit binary files as they stand? Can a modem be set up to send and receive with 8 data bits or is 7 data bits a limit on the modem itself? Thank you for any help you can offer.

Carlos Berguido San Francisco, California

A: To start at the beginning: There is no law that restricts the amount of data you can send over the telephone line. In fact, as far as the phone company is concerned, 7- and 8-bit data over the phone is exactly the same. Modems don't care either. The only reason for using binary-to-hex (AS-CII) conversion utilities is if your software (or a very rare hardware setup) doesn't permit 8-bit transmission with a suitable protocol that ensures against transmission

errors. While there is no "standard" setup for transferring binary data files, I usually use 8 data bits, no parity, and I or 2 stop bits (depending on speed). The reason for using no parity (in my case) is that the Haves Smartmodem does not support parity with 8-bit data and 2 stop bits. (Ed. note:PC's Interactive Reader Service uses default values of no parity, 8 data bits, 1 stop bit.)

There are actually two standard (and a number of commercially proprietary) communications protocols governing transfer of 8-bit data. All are designed to

check for errors in transmission, permitting a defectively received block of data to be retransmitted until it is correctly received. Between microcomputers, the most commonly used protocol is alternately called the Modem7 or Xmodem protocol. It was originally developed by Ward Christenson for 8080-based CP/M-80 computers. The full specification for the

Most of the higherquality manufacturers produce roughly similar drives. I have had good experiences with drives from Teac, Fuii, Shugart, CDC. Tandon. Matsushita, and Fuii.

Modem7 (Xmodem) protocol is rather lengthy, but you don't have to implement it yourself. Instead, you need only get a communications program such as PC-Talk III. which supports Modem7 and is very inexpensive (it is userware). The recent versions of most of the other common communications packages also support the Xmodem protocol. (Ed. note: To download the .COM versions of programs available on PC-IRS, your software must support the Xmodem protocol, and we recommend its use to prevent transmission errors, even when downloading straight (7-bit) ASCII files.)

The most common protocol for communications between moinframes is probably Kermit, which was developed at Columbia University. A version of Kermit for the IBM-PC is also available for free. In my opinion, however, this version of Kermit is still very much a mainframe program, quite unfriendly in comparison with regular PC programs such as PC-Talk, Also, you will find that Kermit transfer is agonizingly slow when compared to the Modem? protocol.

The PC Tutor solves practical problems and explains points of general interest. To see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016.



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These and other ortant features do add cost, but that makes a premium drive. Anything that can be made, can be made cheaper, sell for less, offer lower performance, and probably die young. Remember, usually you get what you pay for, and you ALWAYS get

what you don't. L HARD DISKS RE NOT CREATED EQUAL.

There are vast differences in the speed and reliability of Winchester hard disks. Since the IBM PC-AT is an Since the IBM PCAT is an incredibly fast machine, a slow drive can make an AT run like an XT.

So, before you get stuck with a slow drive in your AT, save your bose two grand and buy an XT.

Or better yet, buy the AT of the start of the st and avoid any drive with Access Times over 40 milli-

Now tell 'em the drive ast have a data protecmust have a data protec-tion acheme. One that's easy to use and reliable. Winchester heads read and write while "flying" a few microns above the data surface. If the heads contact the recording

contact the recording media, you risk a head crash, and significant or total data loss So, even a fast drive

without data protection is virtually worthless. Frank-ly, we'd rather sleep at night.

WARE OF ER-DEPENDENT OTECTION SCHEMES. afe landing zone for the eads, but you need to call

heads, but you need to call a separate program to send em there. If you don't call that program, and most folks won't, the heads in these drives ALWAYS land on data when powered down. The slightest bump or vibration can move the heads, wiping out those data tracks. And the R/W

heads can become contaminated, thus increasing the error rate, slowing down average ac-cess until the whole drive Consequently, those drives offer a very high risk of hend crashes, a false sense of security, and

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PEACE OF MIND. Specify AUTOMATIC park and lock of the heads on power down.
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power loss to the drive, and retracting the heads to a dedicated landing zone before they can land on your data. Since this is 100% omatic, user-dependent

OUR DRIVES HAVE ALL BEEN TO BOOT CAMP. Avoid drives that CLAIM PC AT compatibility but can't BOOT the AT By the time you juggle the

diskettes necessary to use one of those drives, the phrase "user-hostile" will have deep personal signifi-We believe that

computers ought to serve people, not the other way around. BEWARE OF THE BARGAIN BAND-SCHLEPPER.

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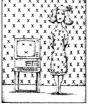
Having trouble constructing the business graphics you want? According to consultant Alice Bernhard, you might be overlooking the most important consideration in business graphics-good visual design.

lice Bernhard, a graphics designer and computer graphics consultant, serves in the business graphics field much the way legendary Julius Erving served his baskethall team. When all the ingredients were there, but the game still wasn't catching fire, the cry was "Call in the Doctor." Bernhard, whose consulting firm is based in Rhinebeck. New York, performs a similar function for corporations that have the potential to develop good computer graphics but have not yet realized it. She shows them how to maximize their investment by directing their attention to the basis of all successful graphic endeavors-good design.

Learning the Language

"When you begin producing visuals, vou begin using a new language-the visual language," Bernhard explains. According to Bernhard, most people subconsciously recognize good design. You see examples of it in magazines, posters, film, video, and other media every day. Even if you know nothing about art, you can often choose the most-effective graphics. You may not know how you do it, but you "know what you like," says Bernhard.

The same holds true for business graphics. Some people, using the same graphics packages, clearly produce much better visuals than others. This is not accidental; people don't repeatedly fall across happy combinations. They learn to recognize and use some definable visual ingredients: line, mass, space, size, color, pattern, and texture.



These elements have universal implications. Everybody at a multilingual, international visual-arts festival understands the best entries. The message isn't restricted to words; there's a whole psychology to visual language that isn't included in a graphics package, she says.

Graphic Abuse

Not only is it essential to correctly use graphic elements, it's also important to avoid misusing them. One example Bernhard cites is a client who was baffled by his viewers' confusion about his most important nie chart. The chart just didn't get the message across, although the data was accurate. The problems? Two adjoining sectors with different information contained almost identical natterns. making both read like one related unit. One relatively insignificant sector was

the same color as the title, forcing the eye and the mind to identify it as the vital element in the graph. These are simple observations to make and easy problems to fix if you know the language.

Bernhard says everybody has learned certain "visual and psychological associations" that they apply in every new visual medium they encounter. However, evaluating your own work with these common associations in mind is often difficult. "When you've composed a visual yourself, you don't see it as the viewer sees it. You confuse the time and energy spent making it with its value."

Another common misconception graphic beginners have is that the more elements in the visual, the clearer the message. They'll add lots of drop shadows, color, patterns, underlines, borders, and whatever else the software package allows. In most cases, these embellishments work against the message. Bernhard says. If the information in a graph is conceptually sound, it doesn't need beefing up with visual trickery. The motto "Less is more" is especially applicable to graphic design.

The Continuity Principle

When you look at a serial presentation, either as a photographic or screenbased slide show, another design principle comes into play-continuity. A presentation must be conceived and developed as a whole. A series of individual pieces may be successful as standalones, but when viewed together, they can convey another message.

A common example of this confusion

is when titles change size, shape, position, and color within a single presentation. Bernhard says, "The viewer really has to work to track the information. The unresolved tension and conflict between the visuals become an integral part of your message and reflect on what you have to say about yourself, your product, and your company."

Among Bernhard's suggestions for evaluating visual continuity is to spread out printous and scan the series. Look where various elements fall, and look at their size, various elements fall, and look at their size, valued in the size of the property of th

Bernhard stresses that the most important time to check your continuity is when you are first planning your presentation. The design process should start at the beginning, and it is essential to state the problem clearly before you start producing your presentation. The design of individual pieces and their continuity should fall into place after you've develoned your idea fully.

Often Bernhard's first contact with a new client is when she is called in to repair a presentation. "The client hands me a pile of overheads or a tray full of slides. What we need, he says, 'is additional material to clarify these,' The size of the collection usually gives me some clue about the conceptual clarity of the presentation. Adding more material is probably not going to help—redesigning the presentation is."

Private Consultation

Bernhard claims she became a computer graphics consultant accidentally. Her first computer-related assignment was computer graphics system. Her client computer graphics system. Her client naturally wanted to produce the presentation's visuals on the actual system. Although Bernhard kept protesting that set type looked better, basically, she was afraid of the computer, she admirated or the computer she afraid of the computer, she afraid of the computer, she afraid or the computer, she afraid of the computer she afraid of the computer, she afraid of the computer she afraid the computer she afraid the computer she a

"The client insisted that we produce at least a couple of sides on the system. So I sketched out some rough ideas and sat down with an operator who was going to execute them under my guidance," says Bernhard. "This was agonizingly slow and frustrating, rather like trying to draw by telling someone else where and how to move the pencil. My growing impatience began to exceed my fear of computers. So we traded seats."

As a result of her surrender to technology, she ended up generating most of the presentation on the client's system. However, Bernhard stresses that most of the actual design work was done before the graphic system came into play. The slides were right on target and the presentation was a success because the system produced the visuals under strict pre-defined guidelines.

Further Adventures

Hooked on the ease of executing her to dieas on this one system, however, Bernhard ventured further. As she became familiar with more systems and packages, she developed some basic design theories for this new medium. For example, later she says, you should use bold, angular illustrations rather than delicate ones with light-weight, curved, diagonal lines because bold lines work better with a com-

Bernhard stresses that most actual design work is done before the graphic system comes into play.

puter's raster structure. She designs to complement the physical limitations of computer graphics rather than fight against them.

"People ask me if I'm not consulting myself right out of a job. If managers, secretaries, and other nongraphic corporate people learn to better utilize their graphics potentials, won't my role as a graphic designer be phased out?" points out Bernhard. However, because of the increased use of graphics, and people's increased dependence on them, pressure is always generated for better graphics. Most graphics packages produce un-

sophisticated work, suited more for inbouse viewing han for professional presentations. True presentation graphics, however, must capture a not necessarily friendly audience, explains Bernhard, Popel's visual expectations are raised, and, according to Bernhard, the professional graphic designer is the best-qualified person to meet those expectations. "Creating effective, competitive graphviewing the properties of the properties of the squeezed in between word processing and spreadsheeting," the says.

The range of skills graphic designers use in their work—those needed in all the phases of the communication process—cannot be replaced by software, according to Bernhard.

The Computer's Role

The computer has undeniably revolutionized the design profession. In Bernhard's opinion, the computer has forced a distinction between the true graphic designer—someone who creates visual solutions for a specific problem—and the graphics technician who operates tools that make pretty pic-

"Everybody, including the graphic designer, must rethink what graphic design is really about," she says. "The computer is forcing this issue and returning recognition of the true designer's role in production. The proof of this is in the reason I am brought in as a consultant My clients have their computers, their software, ... and their empty visuals."

Student Advisement

Bernhauf's advice to design students is to get a broad liberal arts and fine arts background. They shouldn't study specific graphics techniques because they'll soon be outdated. Memorizing visual formats it suecless. A design student should become a generalist, an informed and understand his or her problems. And above all, graphic designers should think of their profession as visual groblem-solving rather than just cutting, pasting, and coloring.

Maureen Jones is a medical illustrator

with an M.A. in computer science.

The PC Student As Teacher

In these days of short-staffed schools and ever-increasing numbers of students eager for computer skills, what could be better than having students do the teaching?



magine that you've just learned WordStar and must now teach someone else to use it. You might be frightened, but you'd reinforce what you'd learned and be forced to fill in any gans in your knowledge.

Joan Targ and Jeff Levinsky have been pioneers of this "teaching to learn" method for helping everyone from fifthgraders to senior citizens become computer literate. The two San Francisco Bay Area educators cofounded a nonprofit corporation, Interactive Sciences, and codirect both the computer program at Palo Alto's Jordan Middle School and the Institute on Microcomputers in Education at Stanford University.

Peer Tutoring

One variation of teaching to learn that Targ and Levinsky have found particularly effective is "peer tutoring," a method that requires people who have just learned to use computers themselves to teach their peers the same skills. The tutors have the chance to cement their new skills by sharing them, and each new learner has personalized instruction from someone who remembers how it feels to

be a beginner. Targ began experimenting with peer

tutoring in the late 1970s when she was director of Jordan Middle School's Independent Study Center for gifted and talented students. A number of the students at the center were eager to learn about computers, but not enough teachers who had the necessary technical background to teach them were available-nor was there enough time or money available to develop and fund a teacher-training program. Also, some of the students who

had computers at home knew more than their teachers

Targ set up a computer class for interested students, but the results were distressing. The kids who already knew something about computers learned more, but those new to computers were overawed by the more advanced students and unsure of their own ability to learn.

Determined to make the program work. Targ developed a new approach. The more knowledgeable students agreed to become tutors, working one to one with those who didn't know much about computers. This time, the results were encouraging. The beginners learned computer skills, and the tutors clarified their own knowledge and gained confidence.

The outcome of this early work was the Computer Tutor community education project. Begun in 1979 under a Title IVc grant, the project is now supported by the school district, with additional funding from other sources. To date. more than 5,000 elementary and secondary school students have participated in the program, and hundreds of parents. teachers, and community members have been reached through weekend workshops.

How It Works

In a typical peer-tutoring session, Targ and Levinsky will have each tutor teach two beginners at one computer. In some settings, more-experienced users known as "circulators" help the tutors if they come up against a problem they can't

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Learners and tutors are matched by their speed and learning style, and lessons are designed to let students proceed at their own pace. Peer tutoring is beneficial to learners because it permits lots of hands-on practice and provides lots of help. In addition, using kids as tutors means a potentially limitless supply of new computer instructors.

Finally, Targ and Levinsky like peer

tutoring's flexibility. It can be implemented almost anywhere-in schools. community centers, or offices.

Across the Generations

Interactive Sciences also uses "crossage tutoring," in which kids teach teachers, parents, business people, and senior citizens-or vice versa.

How do adults react when they discover they're going to be taught by kids? "When you tell experienced teachers that their instructor will be a 12-year-old. you may get some raised eyebrows," says Levitsky. But once they see how well it works, they're sold.

Summer School

For the past four summers, Interactive Sciences has brought the Computer Tutor model to the college campus. Along with the School of Education at Stanford, it cosponsors the Institute on Microcomputers in Education at Stanford University, which offers an intensive 5-week program for educators. The institute brings together educators, researchers, and administrators who want to set up computer programs in their own schools and serve as district resource people.

During its first 3 years, the institute was geared to educators with little or no

"When you tell teachers that their instructor will be a twelve-yearold, you may get some raised evebrows," savs Levitsky. But once they see how well it works. they're sold.

computer experience. They were introduced to the computer by specially selected high-school-age tutors.

In the first year, 1982, the educators followed up their learning session by sharing their new expertise with youngsters attending an Interactive Sciencesaffiliated computer camp at Stanford University. In 1983, Levinsky and Targ separated the camp and the institute and



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When a company offers a superior quality 10 megabyte Winchester hard disk for only \$795, it's bound to raise a few evebrows...and a lot of questions. The fact is, you're probably already wondering "Can I really get a 10 megabyte hard disk that's reliable for only \$795?" The answer is: ABSOLUTELY...when you choose the Sider from First Class Peripherals.

What's so great about the Sider?

For starters, the Sider lets you boot your IBM PC* or PC/XT directly off the hard disk-unlike some other Winchester subsystems. Rebooting is also trouble-free. And the disk is partitionable. giving you a convenient way to organize your data, as well as access the information you store.

What's more, a small "footprint" lets you incorporate the compact Sider into your existing computer set-up with ease.

In addition, with the Sider, you not only pay far less for the subsystem, you also save money on installation. Because, unlike other 10 MB systems that require the purchase of expensive "extras," the Sider is plug and play. Everything you need is provided, including cables, host adaptor, installation software and manual.

What makes it so reliable?

To start, the Sider is manufactured, and sold exclusively, by First Class Peripherals, an innovative computer company which is backed by Xebec. The computer industry's leading manufacturer of disk controllers, Xebec has over a decade of experience serving customers like IBM, Toshiba. Texas Instruments and Hewlett Packard. It's this kind of expertise that helps assure the Sider's performance.

Special design features further enhance reliability. The Sider's controller is the field-proven, industry standard Xebec SI410A. And Xebec's 3200 drive tester, the toughest in the industry, ensures error-free media to keep the Sider operating reliably. * Wast contain hard disk ROM.



longer. A self-contained power supply also adds to dependability by eliminating the risk of heat build-up that could cut PC component life. One more assurance of the \$795 Sider's quality: it's UL Approved and PCC Class B rated.

But why is it only \$795?

You pay less for the Sider than for other 10 MB hard disks simply because you're paying for the superior quality components inside the unit, not for a lot of retail overhead costs. Since First Class Peripherals sells direct, you avoid dealer and dis-

Card #

tribution expenses, and pay only for the product.

What about a guarantee?

Like many experienced PC users, you may be reluctant to buy a hard disk priced at only \$795 without first seeing for yourself how it performs. That's why First Class Peripherals offers you a reassuring, money-back guarantee that eliminates any risk on your part. Simply order the Sider and use it for 15 days. Then, if you're not entirely satisfied, return it and receive a full refund-no questions asked. The Sider also comes with a full

one-year limited warranty. Plus, there's a convenient, toll-free hotline you can call anytime you have a technical or service question, or need help.

Don't delay. Order the Sider now

To receive the Sider 10 megabyte Winchester hard disk subsystem for only \$795, simply order using the coupon below. For faster service, order by phone and charge to your VISA, MasterCard or American Express. (You can also call us if you have any questions or technical concerns about the Sider. We'll see you get the help you need.) Call toll-free:

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tried a new approach to teaching at the institute. "We split teachers up into three groups," says Levinsky. "One learned BASIC, one WordStar, and one Multi-

and each teacher taught the other two."

With this new approach, the ratio became 75 percent learning, 25 percent tutoring, "When we were tied in with the plan. Then we formed groups of three, camp," he explains. "we had teachers

spending twice as much time tutoring as learning." The program could also now reach five times as many educators. This past summer, Microcomputers in

Education became a follow-up confer-

Working with counselors and each other at the camp, beginners learn BASIC and wordprocessing, while more advanced students study graphics, animation, and

ence for people who had attended during the previous 3 years-"a continuation of the subjects they had studied in the past and an opportunity to talk about the problems they have faced." Next summer, the institute will again be for newcomers.

computer music.

Computer Camping

Even though the computer camp is no longer connected with the institute, it's alive and well and still uses peer tutoring. Cosponsored by Interactive Sciences and U.S. Sports Development, the camp gives kids who can't be a part of the regular school program an opportunity to participate in the Computer Tutor pyramid. Working with their counselors and each other, beginners learn elementary BA-SIC and word processing, while moreadvanced students study graphics, animation, and computer music.

"We try to tailor the curriculum to what people need," says Levinsky, "We don't think learning about computers must involve covering every last menu option. We teach WordStar in about 3 hours."

And the Computer Tutor learning chain doesn't end at the camp. The campers pass their knowledge along to a new set of peers-their parents.

Jean Varven is a free-lance writer/editor who often writes about computers in education. She is a former associate editor for Softalk and Softalk for the IBM Personal Computer



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Until Votalker IB and AP, synthetic speech systems for personal computers were like a piano with 50 keys, an eagle with a broken wing, and a singer with a two-octave range. When Votrax developed the SCO2 speech synthesis chip, it was the classic case of advanced technology in need of support systems to unlock its dormant powers. Nov Votalker introduces a revolutionary family of text-to-speech translators - the key to the lock. First members of the family are the Votalker IB for IBM PC and XT and the Votalker AP for Apple II, Apple IIe, and Apple Plus, With Votalker these units play the piano with all 88 keys. Soar through unlimited vocabulary, using 32 inflections and 4,100 pitch settings. Sing in five octaves. and generate sound effects in 16 amplitudes.

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Extensive Analysis with dBASE III and Your PC

For extensive fundamental analysis, a database manager, such as dBASE III, is a viable alternative to dedicated software. With dBASE III, you type in most of your data, but you save money and your data is always up to date.

xtensive fundamental analysis calls for data on hundreds or even thousands of companies. A few specialized database management programs support this type of analysis, but for the time expended, timeliness of results, and cost, a generalized database manager like dBASE III may offer a valuable alternative to dedicated software.

Dedicated software packages make may limited provisions (if any) for manual data entry. The data you buy for these programs usually into typ to date because it comes canned on a floopy disk or you download it via a modern, an expensive procedure. Database managers, on the other hand, allow you to center your own order hand, allow you to enter your own a realistic option for resourceful revestors who are willing to roll up their sleeves, program their computers, and enter a lot of data.

Small-Business Appeal

Not surprisingly, a private database is appealing to small businesses or individual investors for a number of reasons. The cost of keying in data from printed sources is usually lower than the cost of dwomloaded or even recorted data from those very same sources. Moreover, cone you load the database, you own it. You will not have to repeatedly purchase changless historical data and will re-demanded the contraction of the database, which further reduces keyboarding costs.

Of course, this cost-saving approach has limitations. The quality control, comparability of data, and size of your



database may be problematic. About 500 companies is a working limit for most database programs, assuming you store about 250 data items per company.

Custom programming for a private database is not costly if you supply the programmer with a tool like dBASE III and specific instructions. You might even want to program it yourself. For your convenience, here is an example of how you would put together eight coordinated databases for your own database on one specific company.

Five of your databases should contain the data items that make up quarterly and cumulative income statements; two hold numerical data and three hold annotations. The sixth database holds current balance sheets and institutional and insistent stock holdings. The seventh holds company addresses, phone numbers, ticker symbols, SIC (industry group) codes, and other similar information that rarely changes. The eighth database, a rather crucial one used daily for recalculation, sorting, and ranking, contains values calculated or extracted from all the other databases, plus the most current closing prices.

Maintaining a Database

As a prototype for all eight databases, I will discuss the sources, costs, and techniques for maintaining one of the preceding databases, a rather simple system that files and operates on quarterly income data.

You can obtain quarterly income statements from printed materials, from DIS-CLOSURE, Incorporated, on microfilm, or from the companies themselves. (DIS-CLOSURE is a Securities and Exchange



A Member of the Ziff-Davis Family of IBM PC Magazines

Database Scries Begins

PC Tech Journal begins a series on data management products that will continue into 1986. PC Tech Journal editors invested months developing a template for writing the reviews, which cover the most significant data management software on the market today. Taken as a whole, the reviews will enable technically sophisticated developers creating applications for the nontechnical user to easily select the best product for a specific application.

Each product review will be organized the same way and reviewed according to a set of specifications. Each will run a substantive application and its performance will be measured.

COBOL Compilers

PC Tech Journals coverage of COBOL Compilers culminates with an in-depth review of three compilers: 1BM COBOL 1.0, mbp COBOL 9.0, and Micro Focus Professional COBOL. Along with the final review, we'll take a comprehensive, comparative look at all the compilers in this series: DRI Level II COBOL 3.0. Micro Focus Level 11 COBOL 2.62. Microsoft COBOL 2.0, Realia COBOL 1.2, and RMCOBOL 2.0B.

More Tools for C PC Tech Journal will conclude its series

on Tools for C with a report on three C software libraries for data communications programming.

Improving Turbo's I/O

Soon to come in PC Tech Journal: an I/O library that cures Turbo Pascal's deficiencies in file and screen handling.

Commission company that disseminates | information about publicly held companies.) But the best source, at least initially, is business newspapers because they're readily accessible, virtually free-and daily.

One month after the close of a major reporting quarter (December 31, March 31, June 30, or September 30), the Digest of Earnings Reports section of the Wall Street Journal expands from its typical fractional page to a full page and sometimes two. This section includes about 150 reports per page per day at the high tide of quarterly reports. The New York Times and many other major news-

papers offer a similar feature. These very useful, capsulated newspaper reports are based on quarterly income statements. If you were to download 150 quarterly income statements via modem from a commercial database, it could cost about \$2 per report or \$300 per day to match the pace of the newspapers. The data you'd get over the wire is usually cleaner than the newspaper reports and is a complete income statement rather than a digest. And yet, it is hard to overlook the topical value of the Times and Journal reports, day after day, at their bargain prices. But how can you realize this apparent value in terms of better stock market decisions?

Churning Your Data

Earnings digests are just point observations and don't mean much in isolation. Their real value only becomes apparent when you piece their data together

with other data using dBASE III or another database manager. Overall, you must have a record of the preceding and intervening quarters, as well as the current quarter and the year-ago quarter, to get a clear picture of the company.

When you associate this quarterly income data with balance-sheet data (perhaps from Standard & Poor's Stock Guide, the company's own 100 or 10K reports, Value Line, and DISCLO-SURE, Incorporated) and current closing prices, you'll have enough data to run extensive fundamental analyses.

To rapidly capture Digest of Earnings Reports data, you enter the numbers into a screen that you have configured to look just like a blank version of a newspaper report (see Figure 1). For easy data entry, you should also configure your program to display automatically the subheadings (Revenues, Sales, Income, Extra Credit, Net Income, Shares, and Earnings per Share), the description of the period (the quarter ending January 31 in Figure 1). and the year headings, such as 1985 versus 1984. This procedure gives you the basic skeleton of a report. Once you enter the company's name, you establish a record in the quarter's database for the company.

Keystroke Efficiency

If you are going to program this system, you must never use the numeric keypad for cursor control. You need the numeric keypad for numbers; manual cursor control would waste time in this application. Commas and decimals



should be automatically displayed, saving about ten keystrokes per report.

For more economy, you can configure the system to move the cursor to a specific place after each numerical entry. For example, if you don't enter any numbers on the lincome line, you know in advance to make the control of the control of the lincome line, you know in advance to modify them. Therefore, from a zero current licome entry, the curror is free to skip all the way down to the current Net Income line. Logical jumps considerably speed up entry. For the report in Figure 1, I keyed in six numbers and hit the carries of the control of the line of th

An impressive dollar value is attached to keystroke efficiency. With the help of automatic cursor-positioning logic, if you're an experienced operator, you can load a fairly complete earnings digest in 10 to 12 seconds. At this rate, you can enter five reports per minute or the equivalent of the property of the prope

sources.

After you fill in each skeleton report, the program rolls up another blank screen for your next entry. Each completed report is stored. The beauty of the database amanager is that it can logically live accompany's newly entered quarterly report with its cumulative income port with its cumulative income caused the contract of the contract

Rapid-Fire Entry

You load all the other databases from print sources using rapid-fire entry techniques very much like those that are used for capturing quarterly reports. For large rables, you will find it helpful to incorporate automatic panning and scrolling of capture screens. Bear in mind that this data is for your company's internal use, not for resale.

Michael Gianturco is editor of High Technology Investments, an advisory letter published in Houston While both dedicated analysis software and database managers, such as dBASE III. prove useful for extensive analysis, dBASE III is the best approach for small and individual investors be-

cause they can cut costs by entering their own data. Moreover, this data will always be more up-to-date than canned floppy disk data purchased for dedicated software.

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New on the Market

GRAPHICS SYSTEMS

Sausalito-based Computer Colorworks has released a hardware/software graphics package called the Digital Paintbrush, Using a highresolution digitizer and comprehensive image manipulating software, the Digital Paintbrush creates complex graphics images for either display on a color monitor or TV screen, or for printout on a dot matrix printer or graphics plotter.

The Digital Paintbrush digitizer consists of a penlike stylus attached to a case with two strong, lightweight control lines. As the user moves the stylus across a drawing surface, the pen's position is detected by two potentiometers within the plastic case. The software translates the data detected into either menu-selected commands or graphics images on the display screen.

The software for the graphics system consists of four major elements. The main component is the Measurement/Estimate Program, which enables the scientific or professional user to integrate areas from such documents as technical drawings, floor plans, X-ray photos, and so forth; it can



The Digital Paintbrush, The Computer Colorworks

also measure lengths and digitize points. A series of common statistical analyses incorporated in the software can be applied to the digitized data to obtain such functions as mean, standard deviation, coefficient of variance, linear regression. and others. The data can also be automatically plotted to

The Graphics Design Program, a drafting and design system that contains many CAD elements, facilitates creation of free-form images. Features include user-definable color patterns, 45 brush shapes and sizes, and 21 original fonts (plus compatibility with the Fontrix font system). Other

available functions include an expanding/contracting image capture mode, a library of scientific symbols. a zoom edit mode, automatic "rubber-banding" shapes, and gravity grids. A color separation mode allows for textural overlays and multilavered designs.

The Presentation Program enables users to store. organize, and display pictures in the form of a slide show. The Printout Program simplifies both the creation of transparencies and of hard copy drawn with dot matrix and color ink jet The system also includes

a screen text editor and a

Graph/Chart Program that produces bar, line, and pie graphs from either digitized data or keyboard input. (List Price: \$450) Requires: 128K RAM, two disk drives, PC-DOS The Computer Colorworks 3030 Bridgeway, #201 Sausalito, CA 94965 (415) 331-3022 CIRCLE 669 ON READER SERVICE CARD

PrintMaster, from Advanced Product Solutions, is designed to create customized greeting cards, signs, banners, calendars, and letterheads on many PC-compatible graphics printers. The program's library contains more than 100 graphics images each of which can be resized and positioned anywhere on a projected page. PrintMaster can modify any picture and add new pictures to the library; it also offers 11 different border patterns and 8 type fonts. (List Price: \$59.95) Requires: 128K RAM, one disk drive, PC-DOS, graphics printer. Advanced Products Solutions 800 Charcot Ave., #110 San Jose, CA 95131

(408) 263-9133 CIRCLE 668 ON

READER SERVICE CARD

New on the Market Submissions Guide

Owing to the high volume of new product materials received each week at PC, all submissions to New on the Market should follow these guidelines: 1. Include the retail price and details of both hardware and software needed for an end-user to properly use your new product. This includes required amount of RAM, number and type of drives, operating systems supported, and peripheral equipment needed.

2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements may be included, but in most instances we need more information than is typically included in an ad, Include telephone contacts for marketing and technical questions. 3. If available, include black & white glossy photos of the product, 4 × 5 inches or larger.

New on the Market does not review products; do not send sample or demo copies of software. All product announcements are run on a space-available basis, at the exclusive discretion of the editor. Please note that it is impossible to guarantee publication of a product announcement for any particular issue.

PC MAGAZINE • JULY 23, 1985

GRAPHICS SYSTEMS . TEMPLATES, UTILITIES & PROGRAMMING TOOLS

The Drawing Tablet from Software House is a low-cost graphics program with a 640 × 200 dot high-resolution mode for creating high-quality images. A freehand painting feature allows the user to choose a "paintbrush" from any of 100 different sizes, ranging from a thickness of one pixel to approximately 1/4 the size of the screen. Block functions include moving, copying, or erasing user-defined areas of the screen, and permitting complex repetitive images to be built up from single drawings. Additionally, the moved or copied blocks can replace data at a new screen location and can themselves be either overlaid by the existing image or inlayed within the underlying image.

A drawing created with the program can be confined to one screen or, by using a page mode, can be expanded to three screens in height. Print features allow images to be produced on a graphics dot matrix printer in three different sizes.

The Drawing Tablet also provides a library function for saving commonly used picture elements. The library function allows the user to work with symbols as though each were an individual cursor. (List Price: \$49.95) Requires: 192K RAM, one disk drive, PC-DOS 2.0, color/graphics adapter. K Software House Rte. 2, Box 83B1 Unionville, TN 37180 (615) 294-5090 CIRCLE 667 ON READER SERVICE CARD



QUAM Qc1029 CRT/RAM/Mono Graphics Board, QUAM Corp.

QUAM Corp. 's Qc1029 CRT/RAM/Mono Graphics board provides high-resolution monochrome graphics plus up to 512K of RAM, a parallel printer port, and an auxiliary async communications port on a single fulllength board. The monochrome graphics output is compatible with the Hercu-

les standard, permitting the Qc1029 to be used with such programs as 1-2-3 and Microsoft Word without modification.

Compatible with the standard IBM Monochrome Display Adapter, the Qe1029 includes support for RGB output and an interface for a light pen. Its graphics mode provides an on-board 64K RAM screen buffer capable of holding up to two full screens of graphics data in memory, each with a resolumemory, each with a resolu-

tion of 720 dots × 348 lines.

The board's parallel port offers all of the functions of the IBM board's port, plus a full 8-bit status mode and a 6-bit read/write control port mode. The RAM complement of the board includes ninth-bit parity checking. Memory can be expanded in increments of 64K or 256K, and each bank can be dis-

abled or mapped to any 64K/256K boundary in the user's memory range. (List Price: With 256K RAM, 5699) QUAM Corp. 900 W. 128th St., #308 Burnsville, MN 55337 CIPICLE 666 ON

TEMPLATES, UTILITIES & PROGRAMMING TOOLS

Trillian Computer is offering Demo-Tutorial Generator, a tool that makes it easier to create demonstracasier to create demonstrations for the promotion and support of PC products. Presentations created with the Demo-Tutorial Generator can be self-running or interactive and can run on any IBM PC system with or without color, graphics, sound effects, and animation. The program, however, can make use of this support hardware if present.

also be run concurrently with the software being demonstrated. This capability makes it possible to use Demo-Tutorial Generator for creating on-line tutorials for software packages. (List Price: \$6,800) Requires: Varies according to project under development.

If desired, the demos can

ment.
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Demo-Tutorial Generator, Trillian Computer Corp.

TEMPLATES, UTILITIES & PROGRAMMING TOOLS • MASS STORAGE DEVICES



SYSLOG, Apex Resource

Users needing to keep a log of their system usage may find that SYSLOG from Apex Resource fits the bill. SYSLOG provides semiautomatic record keeping of log-on/log-off dates and times, operator ID, project ID, and elapsed time. The utility accumulates total elapsed time on a system by both business and nonbusiness categories, providing this information by percentages. Reporting options include date range, entry number range, operator ID, or

project ID. (List Price: \$29.95) Requires: 128K RAM, one disk drive, PC-DOS 2.0. Apex Resource 23 Christine Ct. Stormville, NY 12582 (914) 221-2611 CIRCLE 664 ON READER SERVICE CARD

The Binary Workshop is offering Easy Color for Lotus 1-2-3, a utility that gives the user control over screen colors for 1-2-3 worksheets. EasyColor lets the user assign different colors to foreground and background, as well as to protected ranges,

worksheet and screen borders help screens error messages, key flags, and the "WAIT" flasher that 1-2-3 displays during calculations.

Easy Color for Lotus 1-2-3 also controls screen colors for graphs. Its graphics mode lets the user select background and lettering colors that contrast with those assigned to data ranges shown in the graphs. In graphics mode, the utility provides four color pallettes and a range of patterns.

Easy Color does not require special programming expertise. Written in compiled BASIC, it is called up from DOS separately from 1-2-3. It then presents its own mockup worksheets for coloring, permitting the user to experiment with the displays before working with actual 1-2-3 data files. (List Price: \$19.95) Requires: 128K RAM, two disk drives, PC-DOS, Lotus's 1-2-3. The Binary Workshop Dept. 900, P.O. Box 694 Urbana, 1L 61801 (217) 356-4311

CIRCLE 663 ON

READER SERVICE CARD

dFLOW from Wallsoft Systems is a utility for dBASE II or III programmers that graphically illustrates command file loops, if/else/ endif conditionals, and case constructions. dFLOW produces correctly indented program listings for both individual command files and entire applications systems. It also cross-references all

the modules in a full system

and compiles a concordance of all memory variables used (List Price: \$129) Requires: 128K RAM, one disk drive, PC-DOS, dBASE II or III Wallsoft Systems, Inc.

233 Broadway, #869 New York NY 10279 (800) 23-DFLOW (212) 406-7026 CIRCLE 662 ON READER SERVICE CARD

MASS STORAGE DEVICES

Intel Corp. has released two new board-level products that expand the system memory of IBM PCs by as much as 8 megabytes bevond the 640K RAM PC-DOS barrier. The two new boards, called Above Board/PC and Above Board/AT, are supported by the most recent versions of Lotus Corp. 's 1-2-3 and Symphony, as well as Ashton-Tate's Framework. This development permits spreadsheets and databases to be ten times larger than the size previously possible with these applications.

Four Above Board/PC boards, each with a maximum of 2 megabytes occupying one slot of the user's



system, increase the user's total RAM to 8 megabytes. Similarly, two Above Board/AT boards, with 4 megabytes per board in a piggyback arrangement. confer an equivalent maximum ceiling on the PC AT's RAM. Both boards are

based on the new "Lotus/Intel Expanded Memory Specification" being made available to software developers.

Above Board's Expanded Memory Manager software includes a new DOS driver that both supervises the expanded memory areas and supports multiple applications. It also mixes multiple memory types on one board to accommodate current and future RAM requirements.

Intel markets these two

boards in conjunction with

the 8087 and 80287 math coprocessors. This combination eliminates 1-2-3's "Memory Full" message and supplies the speed needed to handle extremely large worksheets efficiently. (List Prices: Above

Board/PC with 64K, \$395: with 256K, \$595 Above Board/AT with 128K. \$595: with 512K, \$995) Intel Corp.

5200 N.E. Elam Young Pkwy. Mail Stop TOC-03 Hillshoro, OR 97124 (503) 629-7369

CIRCLE 661 ON READER SERVICE CARD

Corvus Systems has introduced the TrimLine Combo, a combination hard disk drive and cartridge tape backup unit housed in a compact cabinet that fits un-

der the standard monitor of the IBM PC. The unit's hard disk provides 20 megabytes of formatted storage capacity, plus tape backup in either 45 or 60 megabyte capaci-

Trimline Combo's menudriven software permits entire-disk and file-by-file backup options. The menu system also allows the user to establish backup defaults to simplify routine backup procedures. Each cartridge tape is equipped with a DOS-accessible directory of the backed up files at the start of the tape (List Price: \$3,295) Corvus Systems Inc

2100 Corvus Dr. San Jose, CA 95124 (408) 559-7000

CIRCLE 660 ON READER SERVICE CARD

EDUCATION/

ENTERTAINMENT TRIVEAX. from Tessera. is a collection of three trivia games with a common, specialized subject area: Science Fiction literature. Over 5,300 questions cover more than 550 books and 150 authors. The three games, Encyclopedia Intergalactica, Galactic Survey, and Beat The Dragon, each have separate data sets for questions.

Encyclopedia Intergalactica randomly selects questions from its data set of 3,575 and compares its stored answer against the one entered by the player. An Options Menu is included for choosing a range of game modifications.

Galactic Survey provides 1,725 questions from 12 randomly selected categories. Categories include such areas of S-F literature as fictional aliens, lovers, and famous captains with their ships.

Beat The Dragon is a "Hangman" type of game. Its dictionary contains more than 3,500 galaxies, aliens, characters, ships, planets, and phrases, which the user must guess one letter at a

time (List Price: \$39.95) Requires: 96K RAM. one disk drive. PC-DOS 2.0. Tessera Rte. 6. Box 338K6 Columbia, SC 29210

(803) 732-3197 CIRCLE 659 ON READER SERVICE CARD Anderson Aviation an-

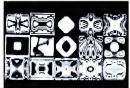
nounces a new flight simulation program, IFR/VFR-PC-5, designed primarily for instrument-rated pilots who want to improve their skills. Providing a constantly changing out-the-window view-as well as continuous readings for more than a dozen cockpit instrumentsthe program realistically simulates a wide range of

conditions that a pilot may

encounter in flight, such as







PC Color Spectrum, AFFIRMware

wind turbulence and beavy cloud cover. It includes 23 different airports displayed in correct perspective to the 44 instrument approaches incorporated in the program. The pilot begins a flight

by locating the aircraft either in altitude or on one of the airport runways. Data prompts request cloud base altitude, cloud top altitude, heading, airspeed, wind speed and direction, fuel. and other parameters. During flight, the screen displays the six basic IFR instruments, two VOR/LOC/GS/DME Nav units, ADF marker beacons, tachometer, flaps, landing gear status, clock, fuel gauge, and the forward view through the cockpit window. (List Price: \$49.95) Requires: 128K RAM, one disk drive, PC-DOS. color/graphics adapter. Anderson Aviation Inc. 333 Moore House Rd. Yorktown, VA 23690 (804) 898-5699 CIRCLE 658 ON

PC Color Spectrum from AFFIRMware creates brilliant kaleidoscopic color displays on an RGB monitor, using the alphanumeric capabilities of the IBM and similar color/graphics adapters to the utmost. Unlike similar programs that generate random images one line at a time. PC Color Spectrum creates full video frames at the rate of 10 frames per second. The result is a dazzling, constantly changing display with up to 178 colors and shades.

PC Color Spectrum permits the user to freeze a given frame at any moment, as well as alter the rate at which the screen images change. A text overlay mode that can superimpose up to 5 rows by 13 columns of text in the center of the changing display makes the program suitable for creating presentation titles. (List Price: \$35) Requires: 64K RAM, one disk drive, PC-DOS, RGB

display, color/graphics adapter.

AFFIRMware P.O. Box 586 Drexel Hill, PA 19026 (215) 449-6875 CompuServe: 72355,1201 CIRCLE 657 ON READER SERVICE CARD

REPLACEMENT EQUIPMENT

Hughes Power Products's PC/XT-compatible power supply. Model HSC 130-40, offers 130 watts in four switchable, regulated voltage levels. The power supply is available with two AC receptacles, two EMI line filters, and a built-in cooling fan. It is rated for outputs of 5V/10A, 12V/4.2A, -5V/0.3A, and -12V/0.25A, with an overload capacity of I65 watts. (List Price: \$177.50) Hughes Power Products, Inc. 709 N. Memorial Pkwv. Station F Huntsville, AL 35801 (205) 534-0078 CIRCLE 656 ON READER SERVICE CARD

NETWORKING TOOLS

TIAC's new Network Processing System (NPS) allows up to four workstations or peripherals to be linked to



HSC-130-40 Power Supply. Huthes Power Products

a single host PC, with larger installations made possible by linking host systems together. The TIAC NPS consists of an 8088-based host plug-in board, model PC-424, and four optional submodules: a bus extender, a generic LAN interface, a video graphics and keyboard interface, and a four-channel serial interface.

The PC-424 board takes up one slot in the host PC. It contains two banks of parity-checked dynamic RAM (with either 64K or 256K chips), two JEDEC memory expansion sockets, and its own 8088 microprocessor. The board is designed to relieve the host PC system of all higher-level network processing functions. Four onboard serial I/O channels permit direct connections to

the remote workstations. The optional adapter modules expand the basic functionality of the PC-424. These modules include: The APC-2 (RS-232)



TIAC PC-424 LAN Processor, TIAC Manufacturing.

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and the APC-4 (RS-422) Configurators, which convert the TTL-level serial I/O signals to RS-232-compatible or RS-422-compatible levels, respectively.

 The APC-I0 Bus Expansion Interface, which connects the PC-424 board with a PC expansion chassis.

 The APC-36 ArcNet I.AN Interface-a modified version of the ArcNet tokenpassing protocol allowing the TIAC system to work with other LANs using ArcNet, such as the Datapoint LAN system.

• The APC-48 Video Graphics/Keyboard Interface, providing the PC-424 with an IBM PC video board-compatible video graphics capability. It also provides support for the special keys of the IBM, Key Tronic, or equivalent keyboard.

 The APC-64 Quad Serial Line, four additional, independent serial ports that support either bit or byte communications and use synchronous or asynchronous protocols. (List Price: Basic PC-424 board, \$845) TIAC Manufacturing, Inc. 3084 Spring St. Port Mondy, B.C. V3H 1Z8 Canada (604) 461-1626 CIRCLE 655 ON READER SERVICE CARD

Dynapro announces the Dynalink Intelligent Data Switch, a standalone device for networking up to 16 computers, peripherals, and modems along standard RS-232 serial communications Fast-Point Light Pen, HEL, Inc.



Dynalink Intelligent Data Switch, Dynapro Systems, Inc.

cations channels can be active at any time, at data rates ranging from 150 to 9,600 hits per second. Dynalink allows each

of the 16 RS-232 interfa-

ces to be configured for lines. Up to eight communi-DTE or DCE. Two modes of operation are available. command or operational. In operational mode, Dynalink acts transparently, permitting attached

devices to make or break connections independently. In command mode, the unit validates all commands

and the user is informed whether each command has been completed successfully. (List Price: \$1,575) Dynapro Systems, Inc.

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HEI. Inc. has released a PC version of their Fast-Point light pen for graphics design and manipulation, cursor control, menu or icon selection, and other data entry applications. The light pen is supplied with several soft-



ALTERNATE INPUT/OUTPUT DEVICES • FREE OR LOW-COST SOFTWARE

ware programming aids, including a functional demonstration and a graphics program useful for creating high-resolution screens.

The Fast-Point Pen connects directly to the IBM Color/Graphics Adapter's standard light pen port, or to similar ports on other video boards. It requires no extra memory and is compatible with all standard BASIC light pen statements and functions. (List Price: \$140) HEL. Inc.

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Mindreader MR. 230 bar code reader uses CMOS technology to draw power directly from the keyboard line, eliminating the need for an additional power supply. The device is also equipped with its own serial RS-232 port, permitting it to be used as another interface for devices such as digital scales or automatic parts counters.

The Mindreader MR-230 reads all the most common bar codes and accepts any of the three BarPen optical wands available from the manufacturer. Specify the chosen pen type when ordering.

ordering. (List Price: With BarPen, \$595) Barcode Industries, Inc. 17 Barstow Rd. Great Neck, NY 11021 (516) 466-5770 CIRCLE 652 ON READER SERVICE CARD



Mindreader MR-230, Barcode Industries, Inc.

SynPhonix jr., from Artic Technologies, is a speech synthesizer for the IBM PCir designed to fit the internal modem slot. Together with the Sonix jr speech operating system and the Textto-Speech ir translation programs included with the board, the SynPhonix ir speech synthesizer can generate an unlimited vocabulary from either phonemes or stored strings of text. (List Price: \$175) Artic Technologies

22234 Star Ct. Auburn Hgts., MI 48057 (313) 852-8344 CIRCLE 651 ON READER SERVICE CARD

FREE OR LOW-COST SOFTWARE

Integron System's ScreenWright word processing program, designed especially for film and television writers, produces screenplays in standard film industry format. A small number of simple commands allow ScreenWright to automatically format scripts with multiple indentations and numbered scenes. It can also properly split scenes and monologues running longer than one page automatically inserting "continued" at the

bottom of such pages.

To obtain a copy of the software, send a blank, formatted 51/2-inch disk to the address below. The software's producers ask that satisfied users send donations of \$10 for every screenplay produced with ScreenWright. The program is not copy-protected and may be shared; the producers, however, should be informed of new users. Requires: 64K RAM, one disk drive, PC-DOS. Integron Systems 2850 Broadway, #2A New York, NY 10025 (212) 316,6325

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Zapl.ABEL, Mr. GoodSoft

ZapLABEL by Mr. Good-Soft is a label and envelope addressing program capable of storing an unlimited number of addresses in a single data file. Addresses can be retrieved by either direct cursor selection or through a built-in search function. The data file can also be scrolled.

The software permits the user to adjust spacing sets for particular printers so as to control the placement of labels during printout. Spacing sets can also be configured for printing individual envelopes or continuousform mailing labels in sheets up to four labels across. For specialized printer fonts, an ASCII printer control code may be sent to the printer. (List Price: \$9) Requires: 64K RAM, one disk drive, PC-DOS.

printer. Mr. GoodSoft 813 Engleman Pl. Loveland, CO 80537 (303) 667-6059 CIRCLE 649 ON READER SERVICE CARD

DIAGNOSTICS

An advanced diagnostics system called PC Doc Tester is being offered by DOC Development for field servicing of IBM PCs. Consisting of a plug-in 8088 board and accompanying software, the system allows the user to quickly isolate board-level, major component-level, and signal-level problems at the PC Doc Tester, DOC Devel

user's location.

The PC Doc Tester's hoard, which takes up one slot in the system to be tested, contains an 8088 microprocessor and a ribbon cable with a connector that plugs into the target system's CPU chip socket. It effectively takes over all diagnostic functions from the target system, booting and running the accompanying software from the target system's own floppy drive.

Two separate programs are included with the system, PC Advanced Diagnostics and PC Troubleshootine Assistance. The former helps the user to isolate the problem in a system, incorporating all of the functions of IBM's own Advanced Diaenostics with routines that address the hardware on the PC Doc Tester board. PC Troubleshooting As-

sistance guides the user through signal-level problem isolation. Features include menu-driven opera-

tion and signal waveform displays. IBM add-on hardware currently tested and supported by the program includes the Planar Board. the Serial Communications Adapter, the Monochrome and Color/Graphics Adapters, and the Diskette Adapter. Planned future releases will also support the IBM Fixed Disk Controller and other plug-in hardware.

Also included with the PC

Doc Tester system is 8088 Emulation Monitor, a hardware addition functionally equivalent to the DOS Debug facility. This permits the user to develop test software on the PC, then download and run it via the Emulation Monitor. The Monitor supports most of the features of DOS's DEBUG facility. (List Price: \$2,450) DOC Development P.O. Box 1163 Sugar Land, TX 77487 (713) 980-9407

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Your Digital Solution

MICROLOGIC provides you with a similar interactive drawing and analysis environment for digital work. Using standard PC hardware, you can create logic diagrams of up to 9 pages with each containing up to 200 gates. The system automatically creates the netlist required for a timing simulation and will handle networks of up to 1800 gates. It provides you with libraries for 36 user-defined basic gate types, 36 data channels of 256 bits each, 10 user-defined clock waveforms, and up to 50 macros in each network. MICROLOGIC produces high-resolution timing diagrams showing selected waveforms and associated delays, glitches, and spikes-just like the

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Regarding MICROLOGIC . . . "An efficient design system that does what it is supposed to do at a reasonable price" (Byte 4/84).

MICROCAP and MICROLOGIC are available for the Apple II (64k), IBM PC (128k), and HP-150 computers and priced

at \$475 and \$450 respectively. Demo versions are available for \$75. MICROCAP II is available for th Macintosh, IBM PC (256k), and HP-150

systems and is priced at \$895. Demo rsions are available for \$100. Demo prices are credited to the purchase price of the actual system

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MIS, Inc., September 1984 A leading supplier to Corporate America

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Software News, March 1985 Corporate Sest Sellers List

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Hacker Heroes And Corporate Battles

Two new books focus on contrasting themes: a personal history of the computer hacker and the struggle of top computer firms to survive the current industry shakeout.

wo completely contrasting cultures have grown up around the computer in the last 25 yearsthe romantic, anticorporate individualism of the hacker and the bottom-line pragmatism of the big computer companies. Steven Levy's Hackers: Heroes of the Computer Revolution looks back nostalgically at the golden age of computer hackers. Stephen I. McClellan's The Coming Computer Industry Shakeout chronicles the growth of 40 major computer companies now undergoing midlife crises. These two books come together in the uncertain present: Levy's hackers, who created the personal computer and computer game industries, find themselves competing in the big leagues as their kitchen-table operations become multimillion dollar corporations. McClellan's old-line corporate players are trying to find new nicbes.

Hacking Forever Levy's Hackers looks at the history of

computing from a very personal point of

Hackers: Heroes of the Computer Revolution Steven Levy

Anchor Press/Doubleday 501 Franklin Ave. Garden City, NY 11530 Copyright: 1984 Cover Price: \$17.95 ISBN: 0-385-19195-2

CIRCLE 673 ON READER SERVICE CARD

view-Levy tells the stories of some of the colorful individuals whose work was the basis for the personal computer revolution. As Levy sees it, vesterday's late night tinkerers on campus mainframes and today's computer game superstars



are linked by a common spirit he calls the "hacker ethic." He defines this ethic as a love of computing for its own sake, a desire to know what makes the machines tick, and a certain brand of individualism. His hackers are freedom-loving. irreverent geniuses with a social conscience, modern-day Robin Hoods determined to free information and technical

secrets from the corporate giants and make them available to the people.

Levy's tale encompasses three generations of hackers. His first heroes, from the late fifties and early sixties, the young TX-O master. Peter Deutsch; the Al guru, Bill Gosper, and the archetypical hacker, Richard Greenblatt who explored MIT's huge multimillion dollar computers. These guys haunted the computer centers in the wee hours of the morning, playing and learning the circuits. For them, a stolen session with DEC's PDP-1 was akin to nirvana

Hacking for the People

Second-generation hackers in the tumultuous 1970s tried to make computers more accessible to everyone. Lee Felsenstein worked tirelessly to offer computers to the people with his prophetic Community Memory project. Ted Nelson envisioned a world of shared information networked by computers and began a crusade against centralized control of computer technology and the propagation of myths about computers, which he dubbed "cybercrud." Bob Albrecht's People's Computer Company and the Homebrew Computer Club attracted hundreds of San Francisco Bay Area hackers. This Golden Era of hackerdom culminated in the birth of the microcomputer, from home-built kits like the Altair 8800 to the groundbreaking invention of the Apple in Steve Wozniak's

Levy calls the third generation "software hackers." Their forbidden fruit is the dollar. Computer knowledge for its

дагаде.

own sake and games are no longer their only motivation. The figures at the bottom of the spreadsheet are as important as the quality of the "hack." But Levy believes the hacker ethic lives on.

A Partial Portrait

Hackers does not pretend to be comprehensive. It is a selective, if not myopic, look at the author's favorite computer milicu

Levy does capture the essential composite of the hacker personality but fails to accept that the true backer, driven by machine lust, is equally content to back in the corporate corridors. He is also natively optimistic about the collective spirit of computing, which he believes will ultimately prevail. In a way, Levy says, one major backer battle has already been oun. Computers are on everyone's desktops and the corporate enemy has adapted and adopted.

Industry in Turmoil

"The implosion has begun," says Sie"The implosion has begun," says Siephen McClellan in The Coming Computer Industry Shakeout. McClellan examines a contraction in the maturing
computer industry that is even more prosounced now than when his book was
published last year. He predicts that
many companies in the now-bloated
market will fall prey to the symptoms of
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McClellan's no-nonsense analysis anwers some interesting questions for industry watchers. How did IBM recoup from its mid-life crisis and what can you expect from Big Blue in the future? What hope is there for the "BUNCH" (Burroughs, Univas (Sperry), RCR, Control Data, and Honeywell?) When, if ever, should successful enterpreneurs relinquish control to professional management? What are the symptoms of an ailing company?

The book is as fast paced as the industry itself; the writing is crisp, upbeat, and incisive. McClellan establishes himself as a combination Doctor Spock/Jeanne Dixon for the computer industry, offering advice for parents of ailing companies and predicting the scorecard at the end of the shakeout.

The Big Picture

Refreshingly, The Shokeoun's tour of the industry is not limited to the small personal computer segment, which McCellan sees as a microcosmic barometer for the turbulent whole. While recognizing the personal computer's role in shaping the nature of the industry, the author is more concerned with the big shakeout, affecting the well-entrenched main-frame, minicomputer, plug-compatible,

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Drawing on conversations with their CEOs, McClellan profiles 40 of today's top computer firms. He predicts a very different crowd will emerge as front runners in the next decade. Only IBM remains unshakeable. His advice is brutally honest and occasionally patronizing. For Honeywell he suggests a graceful exit from the computer business. He encourages AT&T's cautious optimism and sensitization to the commercial market. For Xerox he prescribes a changeover to an integrated-systems orientation. He describes a trend toward professional management as the Dave Packard/ William Hewlett generation nears retirement. As for Apple? "Camelot is gone for good," says McClellan.

McClellan's Rules

For over 15 years, the author has watched the computer industry mature from his Wall Street perch as vice president and chief computer industry analyst for Salomon Brothers. He is well qualified to advise industry watchers on what makes a healthy company. Look for something unique or different about the company's business, he says. Check the management's background. Is the company founder still around? A varying rate of growth in sales and profits is preferable to a steady one. Cash levels should be high, debts low, and inventory tight.

Crystal Balls

Crystal balls show different outcomes to different gazers, but you'll be hardpressed to argue with The Shakeout's observations. Unfortunately, however, so much happens so quickly in this industry

The Coming Computer Industry Shakeout: Winners, Losers and Survivors Stephen T. McClellan John Wiley & Sons, Inc. 605 Third Ave. New York, NY 10158 Copyright: 1984 Cover Price: \$19.95

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that the book already seems dated: a history rather than a look at the current scene. Still, The Shakeout's profile of the industry is savvy and useful. Whether you're an investor, a user, an employee, or just an observer, you're bound to gain new perspective.

Robin Raskin is a frequent contributor to PC Magazine.

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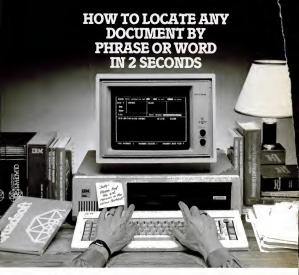
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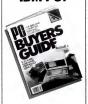
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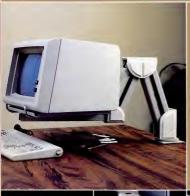
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